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APRIL 1929

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NEW YORK MILWAUKEE CHICAGO

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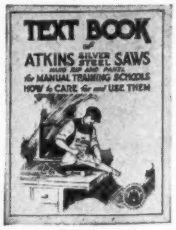

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No. 4

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New York City invites you to the Eastern Arts Convention, April 2 to 5. Turn to page 166 and read the program which the officers of that organization have arranged for you.

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Read the description of the 1929 edition of Bruce's Specification Annual on page 45A of this issue. You cannot afford to get along without this school-shop encyclopedia.

THIS MONTH'S COVER

The picture on the cover of this issue of the INDUSTRIAL-ARTS MAGAZINE depicts that interesting moment in the foundry when the metal is ready for pouring. The picture was taken at the Lane Technical High School, Chicago, Ill.

TABLE OF CONTENTS

Guidance for Boys Through Vocational Training.....129
Robert H. Rodgers

A System of Printshop Instruction and Management.....132
C. A. Crowley

What About the Tool Borrowers?.....137
Victor Randel

EDITORIALS: Ability vs. Results—Business and Art—The Music of Industry—Legislative Attempts to Cripple Education—Loss of Temper—Progressiveness.....138

Drafting-Room Management and Control.....140
T. A. Hippaka

Super-Kites for Radio Broadcasting.....142
E. M. Wyatt

Getting More Use Out of the School Shops.....147
James F. Kieley

Stereographs as Teaching Devices in Drawing Classes.....149
Frank W. Walsh

SUPPLEMENTS

Special Instruction Sheets.....No. 130
J. I. Sowers

Cabinetmaking Joints.....No. 131
John F. Faber and Jonathan Bright

Stereographs as Teaching Devices in Drawing Classes.....Nos. 132 and 133
Frank W. Walsh

PROBLEMS AND PROJECTS

Special Instruction Sheets.....150
J. I. Sowers

Cabinetmaking Joints.....150
John F. Faber and Jonathan Bright

Typical Examples for the Plumbing Shop.....150
Fred W. Megow

Magnetic Loud-Speaker.....151
Clarence H. Bellmann

Telephone Table and Chair.....152
Lyle Garnett and Ray J. Matasek

Wrought-Iron End Table.....154
Roland M. Torgerson

An Electric Lantern.....156
E. A. Rerucha

A Proof Press.....157
R. Randolph Karch

A Spring Shop Problem.....157
E. W. Manzer

An Educational Guidance Card for Secondary Schools.....159

Properties of Common Woods.....160
H. H. Robinson

A Colony Martin House.....162
Horace E. Boggy

Sheet-Metal Urns.....162
Harry E. Anderson

Minnow Pail.....165
Harry W. Kroll

House Section.....165
Howard W. Boekeloo

To Paint or Not to Paint.....165

Association and Convention Activities.....166
Now, Are There Any Questions?.....168
Among the Industrial-Arts Teachers.....30a
New Publications.....32a
School Shop Equipment News.....36a
News and Notes.....38a

(The articles contained in the Magazine are regularly indexed in "The Reader's Guide to Periodical Literature," and "Current Magazine Contents.")

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THE INDUSTRIAL-ARTS MAGAZINE

Volume XVIII APRIL, 1929 NO. 4

Guidance for Boys Through Vocational Training

Robert H. Rodgers, Division of Vocational Teacher Training and Research, Milwaukee Vocational School

THE subject "Guidance for Boys through Vocational Training" may be viewed broadly to mean counseling in matters of health, morals, responsibilities, occupations, and numerous other life problems. Or, again, it may be interpreted to mean guidance that may come from employment of one kind or another, or from organized experiences offered in an educational institution.

It seems desirable in a discussion of the subject, to limit it to the vocational-guidance activities that may be successfully carried on in an organized educational endeavor, more specifically a part-time school. With the above limits placed about the problem, it will be developed as follows:

1. The factors of the vocational-guidance problem in a part-time school;
2. The organization of the school for vocational-guidance purposes;
3. A summary of the major factors of the problem.

I. The Factors of the Vocational-Guidance Problem in a Part-Time School

The development of a practical usable program of guidance in a part-time school must give consideration to certain facts as they exist in this type of institution.

First, many of the students in attendance are already employed. A recent study of approximately five thousand boys between 14 and 18 years of age in the city of Milwaukee attending the part-time school showed the following percentages at work:

64 per cent of the 14-year-old boys.
71 per cent of the 15-year-old boys.
76 per cent of the 16-year-old boys.
82 per cent of the 17-year-old boys.

It is not safe to assume because these young men are employed that their choice of work is the result of special study or guidance or that they are in permanent occupations.

Second, a brief study of the jobs held by the 14- to 18-year-old boys shows that they are distinctly juvenile occupations, that is, jobs involving running of errands, messenger service, assembling of simple machine parts, carrying, stockroom duties, packing, delivery work, etc. Work of this nature does not carry with it any great responsibilities, nor is the compensation large. This means that these jobs will probably always be filled temporarily by young people passing through them into positions of greater responsibility. Another way of stating the situation is that young people must of necessity take those jobs that are open to them. Again the situation emphasizes the need of vocational guidance and counseling during the first years of employment for the 14- to 18-year-old boy.

Third, the method of securing initial jobs by the boys as shown by the Milwaukee study is enlightening from a vocational-guidance standpoint. It was found that 28 per cent secured work through "walking in and applying"; 29 per cent "through friends"; 24 per cent "through the family"; 13 per cent "through placement and employment office"; 6 per cent "through newspapers, window signs, etc."

It is quite evident, as the procedure is analyzed, that a job is accepted because it is a job and not primarily because of its guidance value to the individual. While specific guidance values may be largely lacking, yet the initial jobs serve the very practical purpose of introducing the young workers to employment conditions, situations, duties, responsibilities, and the habit of work.

Fourth, a further study of early employment shows a very distinct movement by large groups of students out of first jobs some time prior to 18 years of age into second and third jobs that are more permanent.

A question of direct concern to the part-time school is, "Do these young men select the adult jobs as a result of a discriminating study or is it just a case of drifting into anything that may be available?"

A summarization of the problem of guidance facing the part-time school shows:

1. That the problem is very largely one of aiding young men to adjust themselves in the industrial and commercial occupations.
2. That many of the students are employed, but in jobs with limited responsibilities and, hence, with no degree of permanency.
3. That the first jobs, as noted by the methods in which they are secured, are usually taken only because they are jobs.
4. That students while in attendance over a period of several years will shift from jobs of small responsibility to ones of greater responsibility.

Viewing these facts as they exist in probably every community in the country, it is very evident that the business and industrial world is not organized for guidance purposes, nor is the home or friend always qualified to counsel most wisely with individuals. It, therefore, devolves directly upon the part-time school to prepare for this service and to render it as effectively as possible.

II. The Organization of the Part-Time School for Guidance Purposes

The immediate goals of the guidance activities in a part-time school expressed simply and directly are:

1. To disclose to the individual his vocational interests, his vocational aptitudes and abilities, and his personal and physical fitness for special vocations.
2. To disclose to the adviser or teacher particular qualifications of the individual, so that counsel or advice may be rendered as it may be needed.

The accomplishment of these objectives now becomes a problem of organizing the schools' activities.

Certain principles may well be stated prior to a presentation of the details of organization.

First, the range of vocational interests of the members of any group of part-time-school students will be varied and, therefore, requires within the school organization a variety of vocational offerings. Second, the organized practical work offered in any of the vocational fields must be typical of commercial practice or must as closely approximate it as it is possible in a school situation. Third, the practical work must be accompanied by additional subject matter that stresses the importance of selecting a vocation and the conditions and opportunities found within the occupation.

The recognition of these principles immediately leads to a study of the details of organization. What can the part-time school do to provide a variety of vocational activities? At first glance it appears that a school organization is wholly lost in endeavoring to approach the innumerable occupations to be found in any community. A study of the actual situation shows, however, that great numbers of people are grouped in occupations; for example, in the metal trades, building trades, printing trades, electrical trades, automobile trades, commercial occupations, etc. Since it is entirely out of the question for most communities to develop a great range of shops, laboratories, and other vocational classrooms, is it not reasonable to organize them about the trade or occupational groups? Every large part-time school will find it possible to organize occupational classrooms about four or more occupational groups. The local occupational distribution should determine the vocational groups to be offered in the school. In many cities this would mean vocational work organized about the building trades, the office and selling occupations, the metal trades, and possibly the electrical trades, the automobile trades, or the printing trades. This would mean a shop or classroom set up for each of the indicated groups.

The smaller communities with their smaller schools present greater difficulties than the larger cities. Limited school facilities will necessarily mean a smaller range of vocational opportunities and possibly only one shop organized about a combination of the building and metal trades, or such groups of occupations that predominate locally, and the office and selling vocations.

Recognizing the occupational groups as the basis for planning the organization of the vocational activities, the next step is one of preparing the subject matter to be taught. Before proceeding, it is well to recall again that the objectives of this instruction are primarily to disclose to the individual students their vocational interests, vocational aptitudes, and their personal and physical fitness for particular occupations. In other words, the subject matter must be rich from the standpoint of vocational guidance.

The suggestions for the organization of subject matter may be shown more clearly by illustration. It was suggested that the vocational activities be organized about occupational groups, an example of which is the *building trades group*. The details are as follows:

1. *Trades or occupations in the group*
   Carpentry
   Masonry
   Painting and Decorating
   Plastering
   Electrical house wiring
   Plumbing
   Sheet-metal work
   Building contracting
   Architecture
2. *Practical work offered in*
   Carpentry
   Electrical house wiring
   Painting and decorating
   Masonry

This organization means that in the building trades, shop instruction shall be offered on carefully selected practical jobs that are typical of the occupations indicated.

3. *Related technical instruction*

This part of the subject matter includes the mathematics, science, drawing, safety, and facts pertaining to materials and construction that are necessary to perform the practical jobs in the four trades indicated immediately above.

4. *Related vocational-guidance instruction*

This phase of the subject matter should include everything that a young person about to select a life's occupation should know about before making a decision. In this particular case the information should pertain not only to the four trades about which practical work is offered, but also the five other fields included in the entire group. It will include such subject matter as: nature of the work; conditions prevailing in the occupation; opportunities offered; qualifications for entrance and for promotion; how to enter the occupation, etc.

As the organization of the subject matter for a type trade group is more carefully studied, it is evident that practical jobs and the required related technical information are developed about four trades but that supplementary vocational-guidance information is offered to the class groups or individuals for the nine trades or occupations. It would be more efficacious, of course, to offer selected jobs in all nine occupations if it were practically possible; but any one shop or

class will have its limitations. The practical jobs in the four fields should serve to develop the building-trades environment that is necessary when stressing the vocational-guidance aspects of all nine occupations.

It is further evident, as the plan is studied, that every class period must be so apportioned that time will be allotted to the vocational-guidance subject matter. It is suggested that approximately 20 per cent of the class period be devoted to class or group discussions pertaining to a selection of a life's work. Teachers should also expect to spend much time with individual students on matters of guidance if the instruction is functioning as it should.

The plan presented for one occupational group should prevail in each of the shops or classrooms that are to be organized. The principle is also applicable to the smaller communities where only one or possibly two vocational classrooms are possible.

Several other very pertinent problems are present in the program of vocational guidance in a part-time school. Teachers must be so prepared that they know the fundamental jobs in a group of related trades and also possess the economic facts about each occupation that has vocational-guidance value. Further, they must be wholly in sympathy with their guidance function and know certain techniques of working with individuals or groups.

It is also necessary to have available for the use of the student and the teacher accurate vocational information about the several occupations included in the plan of organization. It seems desirable to have this material available in pamphlet form, written in a simple language, not too long, with interesting pictures, so that it will make an appeal to the student.

The initial placement of students is also an important step in the program. A special receiving class where all students will report for possibly the first four times in attendance has much of merit. During this period students are made acquainted with the organization of the school, its objectives, and the special opportunities that are within its doors. The teacher during this time is aiding the student to intelligently select the type of vocational classwork he will enter. Whatever the procedure may be at the time of the induction of students, teachers must recognize that during the first few weeks they must make every effort to diagnose the needs of individual students so that they may be launched upon a satisfactory educational program. Following the initial placement, opportunities should be given students at definite times to change their vocational schoolwork, provided reasons for the best interests of the student exist.

A system of personal records is an essential part in the success of a guidance program. Cumulative records should follow the student in all of his school activities, so that advisers may be in possession of all personal facts that will in any way bear upon the selection of lifework.

Part-time vocational schools or full-time institutions will never completely function unless they recognize their responsibility for aiding students in securing employment in lines of work for which they seem to be best suited. If the organized instruction has resulted in the young person making a vocational decision as the result of possibly one or two years of directed schoolwork, then in order that his time and effort may be fully conserved, the school must further assist in bringing the boy and the job together.

III. Summary

The discussion of the subject, "Guidance for Boys through Vocational Training" has made the effort to show:

1. That the occupational world with its industries, stores, offices, public service, personal service, etc., is not primarily organized as a great vocational-guidance institution for the young people.

2. That young people between the ages of 14 and 18 when first entering employment are not given the privilege of unlimited choice of an occupation, but must of necessity enter upon jobs that have been set aside for the great masses of immature and inexperienced people.

3. That practically all young people during the period of attendance at a part-time school have the problem of considering a permanent vocational choice. Therefore, this type of institution has as one of its major objectives, vocational adjustment.

4. That vocational adjustments of a practical worth may be aided by means of establishing a vocational environment with the part-time school for many occupations. Here students may work for the purpose of ascertaining their vocational interests, aptitudes, and personal and physical fitness.

5. That the vocational environment for many occupations may be obtained by organizing the occupational activities around related groups of occupations.

6. That the related groups of occupations have a subject matter consisting of carefully selected practical jobs with accompanying technical material and a wide range of information of vocational-guidance significance.

7. That vocational guidance does not culminate with the disclosing to the individual of his vocational interests, aptitudes, and physical and personal fitness, but extends to aid in securing employment in chosen fields and to giving such counsel as may be needed in the early years of work in his selected occupation.

FORGETTING ABOUT ART

We are so propelled by science, fed, housed and clothed by science, yes even entertained by science, that in this vast age of construction, industry, and efficiency, science has fairly run away with the job of life. The white heat of scientific efficiency has become the stamp of business and of industry with amazing satisfaction in results.

We are being whirled so fast and checked up and tabulated so efficiently, is it any wonder we have hardly taken time to pause for breath or look about us? But even speed is relative and we see that business has begun slowly to pause and look around at something that had not seemed so important a few years ago! And that something is art—the quality of sheer pleasure and of beauty.—*Helen E. Foulke.*

A System of Printshop Instruction and Management

C. A. Crowley, Instructor in Printing, Albert R. Sabin Junior High School, Chicago, Ill.

THE problem of properly caring for and maintaining equipment in a school printshop is one of great importance to every printing teacher and school administrator who has such equipment under his supervision. When any quantity of production as well as a high grade of instruction must be maintained, the problem confronting the instructor becomes increasingly complex and at times baffling. It is generally understood, even by those least informed on educational theory, that a school instruction shop should not be called upon to produce work of a commercial "rush job" character. As a matter of fact, there are schools which do not have to cope with this evil. The plan which is here outlined does not assume that production is a factor which cannot be eliminated, nor does it condemn the practice of printing school forms and other school matter which can serve a useful purpose. This article simple recognizes that some production must be taken care of, and sets forth a plan of relegating it to the least conspicuous and troublesome place, so that its effects may do as much good, and as little harm as possible.

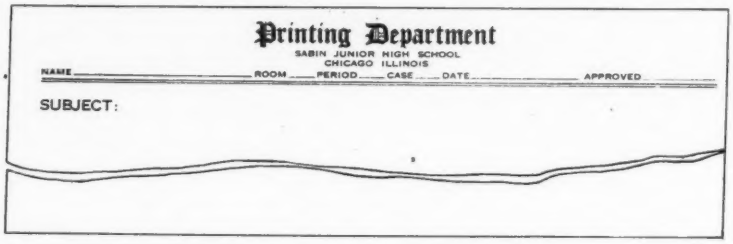


FIG. 1. PAPER FOR NOTEBOOK. ORIGINAL 8½ BY 11 IN.

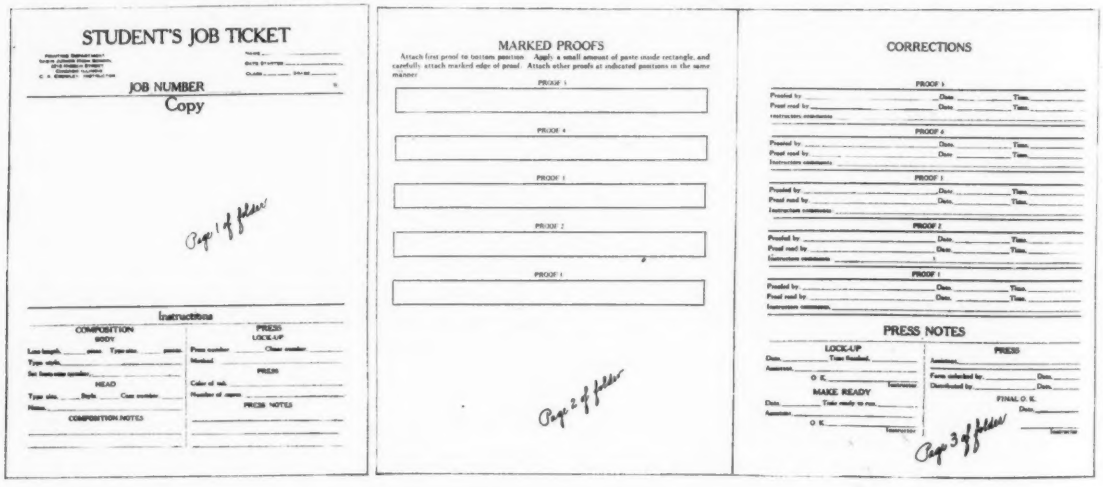
Purpose of the Plan

There must be, first of all, thorough instruction in the rudimentary operations of the printing craft. This must be taken care of in spite of school forms, and necessary rush jobs. There must be, also, a definite and systematic check-up on the student's progress, and last but not least, there must be a system of maintaining every item of equipment in the shop.

Under this plan, the student knows definitely what is expected of him from the very beginning of his work in the printshop. He should also be informed as to how he will be graded, and what factors enter into his grades. To this end, a list of jobs, planned according to the operations they involve, is posted on the bulletin board, and the classes are told which of these jobs they will be expected to complete during their course. Fifteen-minute lecture and demonstration periods are immediately followed by the actual shopwork. These lectures and demonstrations provide the initial stimulus for each new operation.

Job Ticket

Three forms of job tickets are used. These are shown in Figures 2, 3, and 4. The student job ticket, Figure 2, is used for all exercises contained in the course of study, and the student receives the first one just as soon as he is able to set straight composition. Ususally he has accomplished this objective at the end of five or six class periods, which have been devoted exclusively to becoming acquainted with the case, setting the composing stick, and justification.



FIGS. 2 AND 3. STUDENT'S JOB TICKET

The special job ticket is practically the same as that shown in the cut, except for the titles. Page 4 on both of these folders is blank.

Extreme accuracy in justification, and a thorough knowledge of the case are not attained so quickly, of course, but this elementary work should be fairly well mastered in the time stated by even the slowest pupil. The first simple exercises in composition are proofed

GROUP JOB TICKET

JOB NUMBER

GALLEY NUMBER

FIG. 4

and mounted on sheets of blank note paper 8½ by 11 in., or of such other size as will fit the student's notebook. It is very convenient to provide each student with a notebook cover made of four-ply bristol board. These covers may be punched so that all notes and job tickets may be secured therein with a string or clips.

Elementary Composition Exercises

It has been found to be good practice to plan the elementary composition exercises somewhat as follows:

First exercise	4 lines	15 picas
Second exercise	5 lines	18 picas
Third exercise	8 lines	20 picas
Fourth exercise	10 lines	20 picas
Succeeding exercises	20 lines	15 picas

Ten or twelve point body type should be used.

The last exercises will require the dumping of the stick and the typing up of the form. Demonstrations before small groups very materially assist in illustrating the technic of these operations.

Caring for the Rapid Pupil

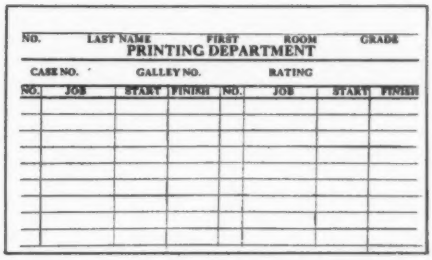
Those who progress more rapidly with the elementary composition exercises are instructed in placing forms on the stone, the two methods of simple imposition, and in the feeding of a press. In the first work in imposition, old linotype slugs are used, in preference to the more fragile movable-type forms. Likewise, the student's first attempt at feeding a press is limited to feeding sheets of bristol board into a slow-moving press without a form. By this practice, the boy is very soon able to time his movements and feed the paper accurately. These boys are then able, later on, to assist their slower classmates in these operations. This gives the instructor a little more time for individual work with the slower workers.

Job Execution Chart

At the beginning of the sixth class hour the job execution chart, Figure 5, is explained to the class. This chart saves much time usually wasted in answering simple questions, and to a large extent makes the student feel more self-reliant and at home in the shop. Copies of the chart, printed on heavy bristol board, are posted on the bulletin board and at other advantageous locations throughout the shop.

Student Job Ticket

After the students have successfully completed their elementary composition work they are given student job tickets (Fig. 2) and copy for their new job. The first of these jobs should be locked up, made ready, and a few copies run off on a press. Generally, facilities will not permit each job the student sets to be printed on a press. However, this is hardly necessary, especially in junior-high-school work, since variety in


NO. LAST NAME FIRST ROOM GRADE

PRINTING DEPARTMENT

CASE NO. GALLEY NO. RATING

NO.	JOB	START	FINISH	NO.	JOB	START	FINISH

FIG. 6. STUDENT RECORD CARD
ORIGINAL 3 BY 5 IN.

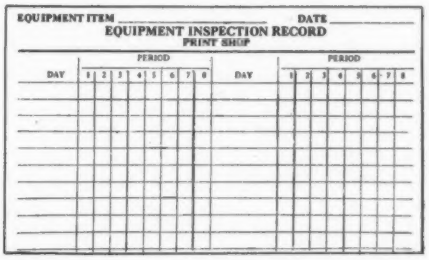
operation and technic are more desirable than specialization in a few operations. Nevertheless, as many jobs as possible should be locked up and printed, since this adds to the student's interest in the work.

The job tickets should involve progressively such new ideas in composition as headlines, including drop lines, inverted pyramids, cross lines, and hanging indentations, as well as initial letters and display composition. Later, cuts and ornaments, and finally border and rule work, including tabular composition, are injected into the copy.

After the first week of instruction individual differences cause the slow, medium, and rapid students to segregate themselves, and instruction must become increasingly more individual. Frequent lectures and demonstrations assist in avoiding complex situations with large classes, although much individual instruction is not only necessary but highly desirable.

Special Job Ticket

As soon as the more rapid students have successfully finished the series of job-ticket exercises, they may be assigned to special jobs. The job ticket used for this kind of work is shown in Figure 3. Great care

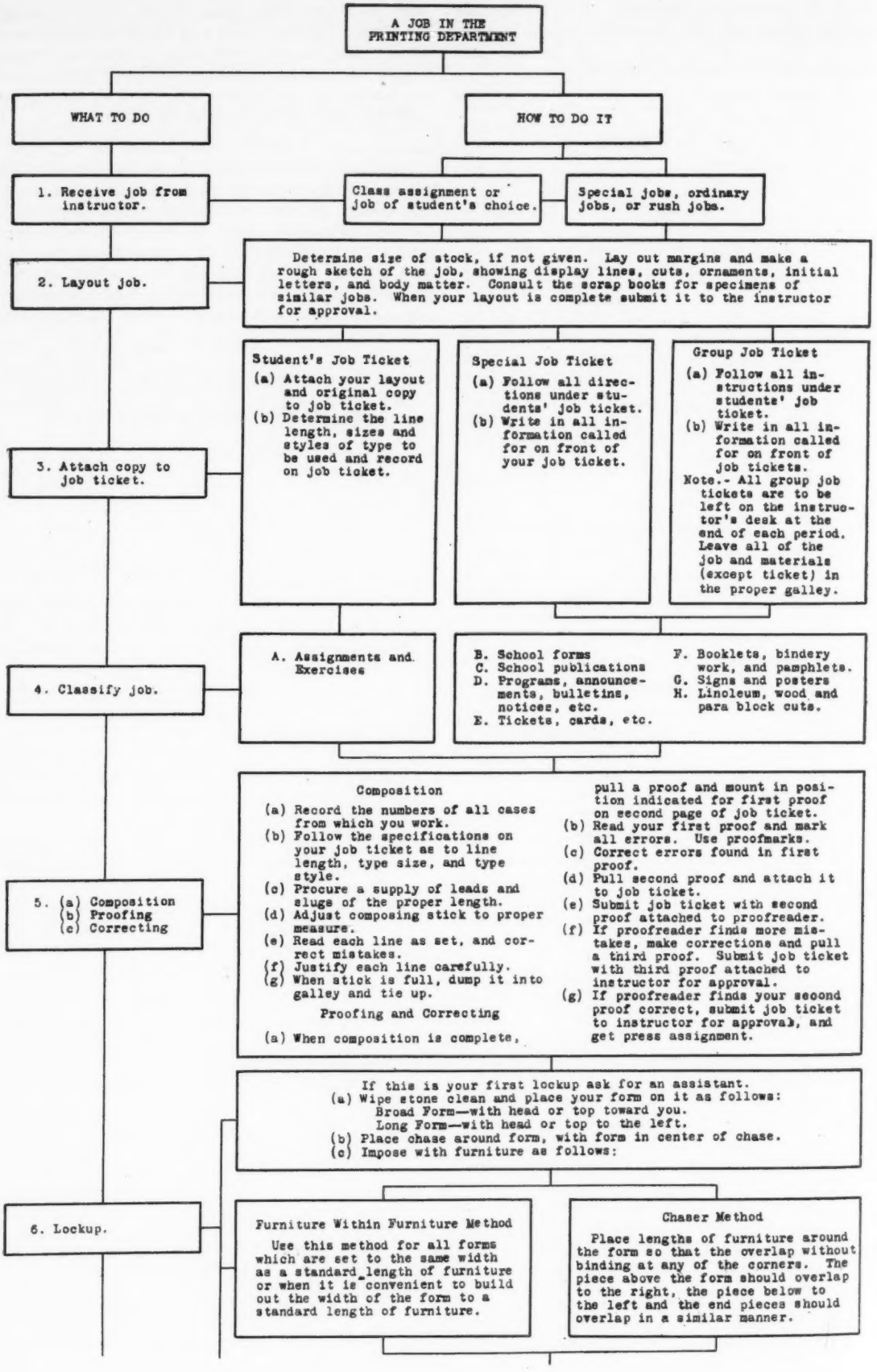

EQUIPMENT ITEM DATE

EQUIPMENT INSPECTION RECORD

PRINT SHOP

DAY PERIOD 1 2 3 4 5 6 7 8 DAY PERIOD 1 2 3 4 5 6 7 8

FIG. 7. EQUIPMENT INSPECTION RECORD
ORIGINAL 3 BY 5 IN.


A JOB IN THE PRINTING DEPARTMENT
WHAT TO DO
HOW TO DO IT
1. Receive job from instructor.
Class assignment or job of student's choice.
Special jobs, ordinary jobs, or rush jobs.
2. Layout job.
Determine size of stock, if not given. Lay out margins and make a rough sketch of the job, showing display lines, cuts, ornaments, initial letters, and body matter. Consult the scrap books for specimens of similar jobs. When your layout is complete submit it to the instructor for approval.
3. Attach copy to job ticket.
Student's Job Ticket
(a) Attach your layout and original copy to job ticket.
(b) Determine the line length, sizes and styles of type to be used and record on job ticket.
Special Job Ticket
(a) Follow all directions under students' job ticket.
(b) Write in all information called for on front of your job ticket.
Group Job Ticket
(a) Follow all instructions under students' job ticket.
(b) Write in all information called for on front of job tickets.
Note.- All group job tickets are to be left on the instructor's desk at the end of each period. Leave all of the job and materials (except ticket) in the proper galley.
4. Classify job.
A. Assignments and Exercises
B. School forms
C. School publications
D. Programs, announcements, bulletins, notices, etc.
E. Tickets, cards, etc.
F. Booklets, bindery work, and pamphlets.
G. Signs and posters
H. Linoleum, wood and para block cuts.
5. (a) Composition (b) Proofing (c) Correcting
Composition
(a) Record the numbers of all cases from which you work.
(b) Follow the specifications on your job ticket as to line length, type size, and type style.
(c) Procure a supply of leads and sluge of the proper length.
(d) Adjust composing stick to proper measure.
(e) Read each line as set, and correct mistakes.
(f) Justify each line carefully.
(g) When stick is full, dump it into galley and tie up.
Proofing and Correcting
(a) When composition is complete, pull a proof and mount in position indicated for first proof on second page of job ticket.
(b) Read your first proof and mark all errors. Use proofmarks.
(c) Correct errors found in first proof.
(d) Pull second proof and attach it to job ticket.
(e) Submit job ticket with second proof attached to proofreader.
(f) If proofreader finds more mistakes, make corrections and pull a third proof. Submit job ticket with third proof attached to instructor for approval.
(g) If proofreader finds your second proof correct, submit job ticket to instructor for approval, and get press assignment.
6. Lockup.
If this is your first lockup ask for an assistant.
(a) Wipe stone clean and place your form on it as follows:
Broad Form—with head or top toward you.
Long Form—with head or top to the left.
(b) Place chase around form, with form in center of chase.
(c) Impose with furniture as follows:
Furniture Within Furniture Method
Use this method for all forms which are set to the same width as a standard length of furniture or when it is convenient to build out the width of the form to a standard length of furniture.
Chaser Method
Place lengths of furniture around the form so that the overlap without binding at any of the corners. The piece above the form should overlap to the right, the piece below to the left and the end pieces should overlap in a similar manner.

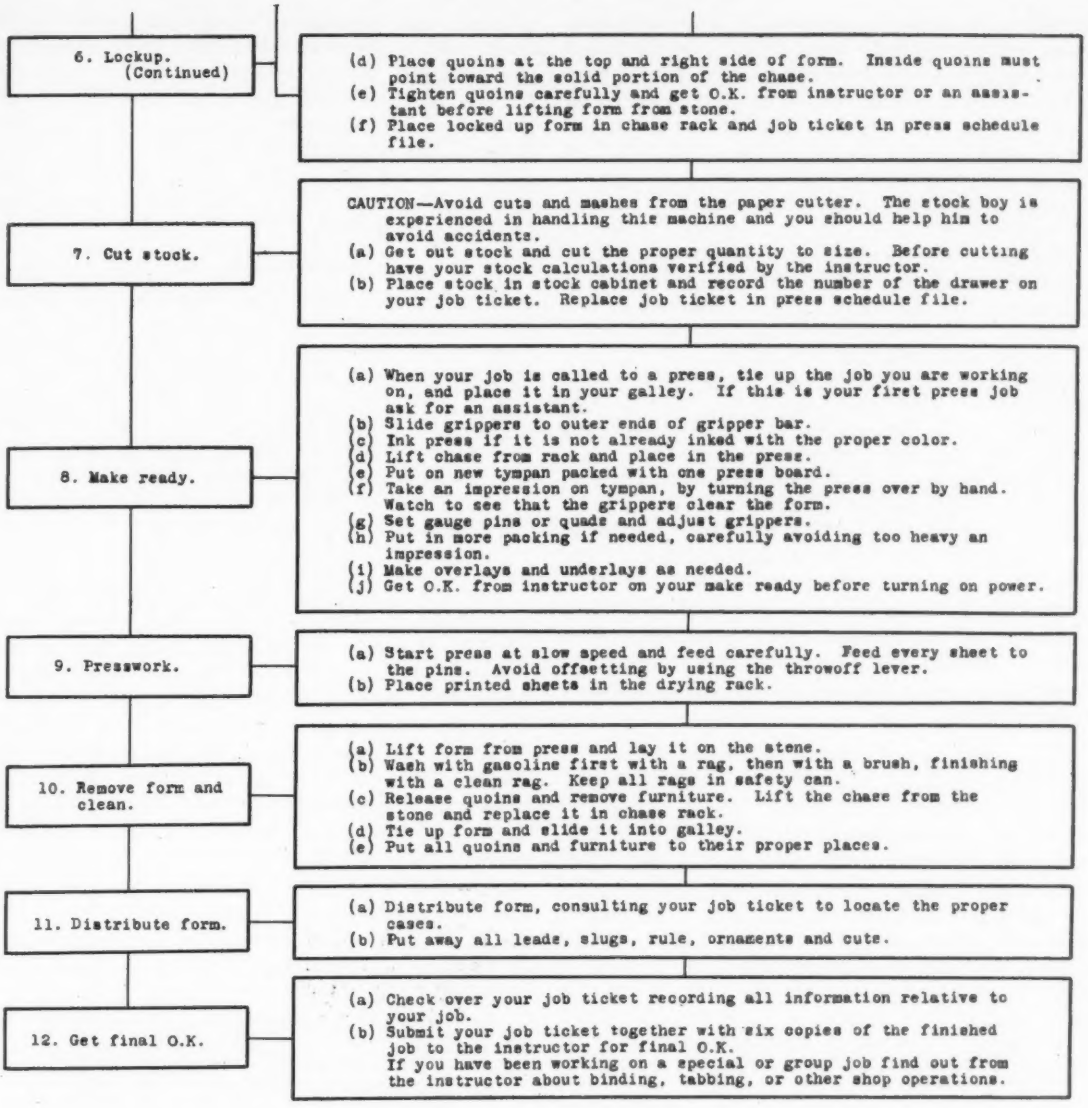

6. Lockup. (Continued)
(d) Place quoins at the top and right side of form. Inside quoins must point toward the solid portion of the chase.
(e) Tighten quoins carefully and get O.K. from instructor or an assistant before lifting form from stone.
(f) Place locked up form in chase rack and job ticket in press schedule file.
7. Cut stock.
CAUTION—Avoid cuts and mashes from the paper cutter. The stock boy is experienced in handling this machine and you should help him to avoid accidents.
(a) Get out stock and cut the proper quantity to size. Before cutting have your stock calculations verified by the instructor.
(b) Place stock in stock cabinet and record the number of the drawer on your job ticket. Replace job ticket in press schedule file.
8. Make ready.
(a) When your job is called to a press, tie up the job you are working on, and place it in your galley. If this is your first press job ask for an assistant.
(b) Slide grippers to outer ends of gripper bar.
(c) Ink press if it is not already inked with the proper color.
(d) Lift chase from rack and place in the press.
(e) Put on new tympan packed with one press board.
(f) Take an impression on tympan, by turning the press over by hand. Watch to see that the grippers clear the form.
(g) Set gauge pins or quads and adjust grippers.
(h) Put in more packing if needed, carefully avoiding too heavy an impression.
(i) Make overlays and underlays as needed.
(j) Get O.K. from instructor on your make ready before turning on power.
9. Presswork.
(a) Start press at slow speed and feed carefully. Feed every sheet to the pins. Avoid offsetting by using the throwoff lever.
(b) Place printed sheets in the drying rack.
10. Remove form and clean.
(a) Lift form from press and lay it on the stone.
(b) Wash with gasoline first with a rag, then with a brush, finishing with a clean rag. Keep all rags in safety can.
(c) Release quoins and remove furniture. Lift the chase from the stone and replace it in chase rack.
(d) Tie up form and slide it into galley.
(e) Put all quoins and furniture to their proper places.
11. Distribute form.
(a) Distribute form, consulting your job ticket to locate the proper cases.
(b) Put away all leads, slugs, rule, ornaments and cuts.
12. Get final O.K.
(a) Check over your job ticket recording all information relative to your job.
(b) Submit your job ticket together with six copies of the finished job to the instructor for final O.K.
If you have been working on a special or group job find out from the instructor about binding, tabbing, or other shop operations.

FIG. 5. JOB EXECUTION CHART

and judgment should be exercised in assigning these jobs. Accurate layouts and plans for each special job should be worked out by the student, and, if possible, the student himself should procure the final O.K. from the principal or teacher requesting the order.

Specimens of jobs from a wide variety of sources, including school jobs, are collected in scrapbooks which are kept on the instructor's desk. The boys are told to consult these scrapbooks freely while planning their jobs, not with the idea of copying the layouts in their entirety, but rather as a source of ideas, and as a guide setting forth standard and accepted practices for the various types of printed matter. Many pupils will display originality in their layouts, while others, as would be expected, copy from anything that looks good to them. This practice is not to be discouraged, however, since everyone does not possess originality and it is far better for the less imaginative to imitate a good idea, than to waste their efforts on a useless and impractical design of their own.

A part of each lecture period should be devoted to demonstrating the successive operations called for in the job execution chart. Needless to say, the student will be required to take notes on all lectures and demonstrations. Blackboard illustrations of demonstrated technic which the student may copy in his notebook, are very helpful. This is especially true with respect to the slow student.

Group Job Ticket

If it is necessary to produce a rush job, it should be scheduled on the group job ticket shown in Figure 4. This should then be assigned to one of the most advanced students of each class. Such rush jobs should, of course, never be attempted until all of the classes are far enough advanced to handle all details, so that the instructor will not be required to neglect his classes in order to get out the job. When a few students in each class have finished the instruction units of the course of study and have successfully completed a few simple special orders, they may with

some degree of profit be assigned to the handling of a group job during their hour in the shop. It is not every student in a class who can profitably cope with this class of work. The group job involves, even under ideal conditions, the interpretation of the work and notes of others, and a higher degree of standardized technic than is usually attainable in the short exploratory printing courses offered in junior high schools. With painstaking pupils, accurate in their methods and possessing a rather greater element of personal responsibility than the average adolescent, this type of job may be pursued more or less profitably.

Recording Progress

A record of the individual student's progress is kept on the student's record card shown in Figure 6. This card shows both the degree of progress, the job number, and the time element on each job. It is advisable to require of all a uniform and rather high standard of quality in their work. In maintaining this standard, the time element is a very good barometer of the composite elements of skill, accuracy, and attentiveness.

In the rating column on the record card, notes relative to the student's weak or strong characteristics may be noted by means of a numerical code. This information is useful in applying remedial or corrective measures.

Equipment Inspection Record

Each student must maintain his equipment; information showing his diligence in this respect is supplied by the equipment inspection record card (Fig. 7). A pupil from each class, or in large classes, one from each alley of cases, is made an inspector. He inspects the cases at the beginning of his period, and records the results in the proper column for the preceding class. In the same way, a record is made of the condition in which the presses were left by the previous class. This method of inspection eliminates the elements of personal friendship and fear of bullying by the one who is being inspected. The inspector does not know who worked at the positions in the preceding class, and consequently is less likely to be biased or in any way unfair in his inspection. A letter code is most serviceable in recording the inspection results. This code should be posted so that the inspector will not have to rely on his memory. The code which follows has been found very efficient.

A. Perfect order.
B. Type on floor—case O.K.
C. Case partially pied.
D. Case partially pied and type on floor.
E. Machine oiled and wiped.

Other code letters and systems of marking the cards for items of equipment and machinery can be developed so as to form a means of permanently recording all repairs, adjustments, and maintenance operations.

This system of maintenance is extremely serviceable in shops where all classes must use the same type cases. It definitely establishes the responsibility for a pied case and thus makes it possible to protect each student from having to clean up the debris left by another. It is advisable to keep five or six extra cases of body type at hand to replace any seriously pied cases, holding the mistreated case and its contents for the negligent one to rehabilitate at his next class period. Experience will show that after the system is understood, an inspection is only necessary about once a week, and frequently is not badly needed then. Of course, if individual cases are available for each student who works in the shop, the procedure could be greatly simplified.

Grades Reflect All Elements

Grades should reflect not only the student's proficiency in the operations of printing, and his store of printing information, but also his diligence in the care and maintenance of all equipment with which he works. Both elements are reflected in this recording system and may be weighted for grading purposes as the instructor sees fit. All of these factors are important, and should receive consideration in the mark. A comparison of work habits and accomplishments in any shop will verify this conclusion.

Other Applications

The system just described, in a modified form, has proved itself serviceable in various school shops, chiefly because of its definiteness and concise organization. The clerical work required after once inaugurating the plan is as slight as can be expected of a plan which really accomplishes its purpose in such a complicated subject. The students themselves do the greater part of the work, and this is as it should be, because they thus benefit by acquiring systematic and orderly habits, in addition to gaining some understanding of the craft in which they are temporarily working.

CABINET DECORATED BY DANTE GABRIEL ROSETTI
Metropolitan Museum of Art

What About the Tool Borrowers?

Victor Randel, Director of Industrial Education, Sam Houston State Teachers College, Huntsville, Texas

THAT is the question. What are you going to do about the fellow who comes to your shop to borrow a saw for just a few minutes, or a hammer with which to pull a few nails and then proceeds to forget to return them? Tool borrowers, taken as a whole, are usually just as fine as any other folks. Most of them have no intention of disrupting one's system of keeping his tools in order. The average tool borrower does not realize that loaning him a screw driver or a monkey wrench for a short time causes the industrial-arts teacher any particular inconvenience or annoyance. Perhaps there would be no trouble if only one such borrower lived within borrowing distance of the industrial-arts department. But what industrial-arts department of any consequence is there, that is not patronized by a half dozen or more loyal borrowers.

Of course, the tools in the shop are purchased primarily for the use of the students taking shop courses, and these tools should be kept available for those students at all times. In fact, in most well-regulated schools, the shop teacher is held more or less responsible for the care and upkeep of the tools and of the equipment in his department. In many places, too, the shop teacher feels a certain sense of responsibility relative to the trust the school board has placed in him regarding the care of the shop tools. Many a conscientious industrial-arts teacher works out what looks to him to be a good system for keeping a check on the tools under his care. The system seems to work fine until one day the teacher finds that one of the borrowers has a tool out that is needed very much by a member of the class. If the teacher is lucky he may remember the name of the borrower. In this event he can send for the missing tool. Too often, however, he has forgotten to whom he loaned the much-needed tool. Then is when the teacher's trouble begins.

Since most industrial-arts teachers have had more or less unsatisfactory experience with borrowers, it seems that some suggestions for handling this problem might be helpful.

In the woodworking shop of the Sam Houston State Teachers College a system for placing individual responsibility for tools is working nicely as far as the students are concerned. Each student in bench woodwork is provided with an individual plane iron, two chisels and a two-foot folding rule. For these tools he is required to make a deposit with the school sufficiently large to cover the cost of the tools in case they should be lost or badly damaged.

In addition to these special individual tools, kits of other tools, which may be used by members of other classes, are provided. Each kit is numbered, and they are issued to the students only during the shop period. In each of these kits is placed a jack plane, a backsaw, a marking gauge, a bench brush, and a scratch awl. A place is marked in the kit for each tool, and on each tool is stamped a number which corresponds with the number on the end of the kit. For example, in kit number four, each tool is stamped No. 4. Numbered lists are prepared of the students in each class using the woodworking tools. These lists are posted, one just outside of the toolroom for the convenience of the students and one inside the toolroom for the convenience of the toolroom keeper. This makes checking very simple and almost automatic. In fact, it double checks the tools each time they are used. When the student turns in his kit, he and the toolkeeper both check to see if the tools are all in place. At the time a student in the next class draws a kit, he checks carefully to see that all tools are in place before he takes them to his bench.

In like manner all general tools are numbered and given a definite place in a general tool cabinet. These tools are drawn out by individuals when needed, and a number tag, bearing the student's number, is hung on a hook near the place for the tool. When the tool is returned to the cabinet, the number tag is given back to the student. This system works well. In order to keep it working nicely, however, it became absolutely necessary to lay down a rule against loaning these tools to anyone outside of the classes.

This rule brought up the problem of how to deal with the tool borrower. As a result of this difficulty, a special tool cabinet was provided in which were placed a fairly good hand saw, a hammer, with one claw only slightly damaged, a screw driver that had seen considerable service, a steel square that still had a few visible numbers on it, a monkey wrench with one side of the wooden handle still in place, and several other tools of equal loaning value. Near this special cabinet is a pad of small slips of paper. When the borrower comes to get a tool, he is required to write his name on a slip of paper and also indicate thereon when he expects to return the tool. The tools are nearly always returned by the specified time. However, if the tool should not be returned exactly on time, it affects no one except possibly the next borrower. So far, results are entirely satisfactory.

About the time this system was inaugurated, the one who worked it out invited in, separately, several of his most loyal borrowers. To each one the system of checking the regular tools was thoroughly explained. At the close of this explanation, the cabinet containing the loaning tools was shown to the visitor and it was explained to him how his interests had also been taken care of in the new system.

Each borrower has seen the reasonableness of the system, and so far no one has asked to borrow any tools other than the ones in the loaning cabinet. It's worth the effort.

INDUSTRIAL-ARTS MAGAZINE

EDITORS

E. J. Lake *J. J. Metz* *S. J. Vaughn*

ABILITY VS. RESULTS

Many instructors point to their academic achievements for rating, salary increments, promotion, and often social standing. If the results obtained in daily work measure in proportion to their academic achievements, these instructors have the right point of view. If the results do not measure up to the academic achievement, the point of view taken is wrong.

It is not academic achievement alone which is the measure of a successful instructor, but rather his ability to make use of the opportunities his advanced courses have offered. If the results in his classroom reflect the broadened horizon to which he has been exposed through study, he may well lay claim to higher rating, and he usually receives it without the asking.

On the other hand, if no difference is noticeable in the caliber of an instructor's work after he has taken advanced courses, it would appear that a higher rating is unjustified. If the courses pursued were solely for the purpose of a higher rating and not for betterment in his daily work, it is questionable whether the courses have any immediate value to him or to society.

If a school administration blindly recognizes the higher degrees without first demanding the added ability which rightfully might be expected from such degrees, it offers encouragement for the pursuance of courses for credit only. It is the duty of administration to first see that the added ability gained through university study is applied to teaching before recognition is finally given.

It is not enough to gain the potential ability to do better work through study. Potential ability is worthless unless it is developed. The test of the development is better teaching results.

BUSINESS AND ART

The material-minded business man whose alphabet begins and ends with B for business and overlooks A for art, must be surprised, as we were surprised, when he looks over the roster of the Business Mens' Art Club of Chicago.

Chicago has one hundred and fifty-two active members in a business mens' art club who, in place of spending their short vacations on the golf links or fishing or hunting, go to some rural community and with brush and palette in hand, commune with nature.

This is no pipe or pickle dream of a temperamental idealist, but is evidenced by the yearbook of the club sent to us by L. L. Valentine of Valentine-Seaver Furniture Company, who himself is one of the active members. This yearbook of The Business Mens' Art Club is replete with reproductions from paintings by members of the club. These paintings, which range from landscape and figure pieces to still-life studies, show technique and draftsmanship that rivals professional artwork.

Exhibitions of the work of members are arranged by a committee appointed by the executive board of the club.

From the sketch portrait of President H. B. Colby on the front cover to the urgent invitation on the last page to business men to "joint with us in the study of art," this yearbook of the Business Mens' Art Club of Chicago is evidence of the possible successful combination of business and art in a busy life.

A footnote expresses in the folowing decisive terms the hopes and desires of members:

"To see beauty and long to express it is a great gift. But to have that longing and then neglect to make it articulate, or at least try to transmit it, will dull the power to see and cripple the ability to perform. Only by exercising our powers can they be made to increase. In other words, get busy."

THE MUSIC OF INDUSTRY

There is more than rime in A. E. Gray's "Rimes By A Carpenter" pubished in the December, 1928, Industrial-Arts Magazine. There is more than appreciation of rhythm in the sounds of industry. Even the steam hammer or the electric riveter or the buzz saw of industry is music to the worker, as compared to the jazz of a lazy, wasted life.

We know of one teacher of design in a famous school of architecture who has installed a phonograph in his drafting room. He contends that the boys work better with a tune on the air, but we have observed that for all occupations that make a racket, the worker needs no other music. We all know of industrial-arts teachers who have started a ruction among the teachers of less-noisy subjects by the Industrial noises from their shops.

It would seem from this evidence that the difference between music and racket is not altogether a difference of composition or character of sounds, but a difference as between the producer and the listener.

It does require a fine musical production to hold the audience for more than a short time, but two busy hands can furnish music for one busy mind with any old tool and tune.

The only way to appreciate the music of industry is to work at it and work hard.

LEGISLATIVE ATTEMPTS TO CRIPPLE EDUCATION

Once more the time of the year has come around when legislative bodies in the various states are thinking about formulating new, or revising old laws. It is one of the wonderful prerogatives of the American citizen that he indirectly or directly has it within his power to affect legislation. Of course, the very ease with which legislation can be affected so that conditions may be bettered, also opens the way to the unscrupulous to alter it so as to further selfish interests,

to concentrate power which can be used for unlawful ends, to influence laws so that they may be used for selfish ends or personal aggrandizement. It is not to be wondered at, then, that some of those who are engaged in making the laws for the various states, should also think of altering this or that law which directly or indirectly affects the standing of our schools.

The elementary school, because of its long existence, is seldom attacked. We have forgotten that, at its inception, it had to undergo very severe criticisms, and, not infrequently, this or that politician boldly attempted to wipe it out altogether. Its days of strife are over, but the special types of schools that have since been adopted are not yet so fortunately situated.

The full-time and part-time vocational schools still have many battles to fight before they, too, are on the sound basis that general education has built up. Legislators with short-sighted ardor and Pharisaic hypocrisy will continue for many a year to divert money now spent for the worth-while instruction of our youth into channels more to their own liking.

In order to parade before their constituency the extreme economy of their régime, they do not hesitate to undermine the foundations of our future citizenry. Their continual interfering and meddling with existing laws tends to create a feeling of unrest and hopelessness among educators because of the uncertainty of the system of education which they are fostering. At first sight, this condition seems to be detrimental to the best interests of these special types of education. But history shows us that those movements are strengthened most, which have to withstand the greatest opposition.

The teachers of the part-time and full-time vocational schools ought, therefore, to exult rather than feel depressed when their schools are attacked by these short-sighted and unscrupulous legislators. It must not, however, be forgotten that the attempts of these legislators must be met by unceasing vigilance and by a continued watchfulness to make the results of these combated educational efforts function with ever-increasing directness and definiteness in the lives of the students and of the community. This duty lies in the hands not only of the administrators of these schools, but also of every teacher in the schools.

Opposition must be met by results which cannot be denied. It is then, and only then, that the aggressive howls of the "would be" lions will be turned into the disappointed snarlings of the coyote.

LOSS OF TEMPER

It is seldom that a shop instructor is guilty of losing his temper, but occasionally this happens when that slow-minded or backward boy seems beyond human power to instruct. The boy seems to make the same error day after day, and there seems to be no carry-over from one lesson to the other. Truly, these things are annoying, but merely problems of the classroom.

When one loses his temper, he often makes rash statements which cause his best friends to shun him. A fickle temper is a curse to any person. It is the cause of unhappiness and misunderstandings. It lessens us in our own esteem when we have cooled enough to give the matter sufficient serious thought.

Under no circumstances is the loss of temper conducive to good results in a shop or classroom. It might be necessary to be strict in some ways, but the loss of the instructor's temper is never justified and should be beneath his dignity.

Those who know little of a boy's heart are always ready to punish him with some form of discomfort, instead of appealing to his human side, his love, and his intelligence. Every boy has intelligence to some degree to which an appeal can be made. This appeal should result in mental development, instead of making the boy so angry or uncomfortable that he cannot think.

The remedy for the ones who occasionally forget is a perpetual smile, a sincere effort to have a sympathetic understanding, and the realization of one's own shortcomings.

PROGRESSIVENESS

The best regulated classroom, department, or school, is affected by the changes that are taking place, by the new methods of approach or teaching material being introduced, and by the progress that is being made in testing and testing devices.

All of us admit these things, but very often we find the stereotyped, dyed-in-the-wool instructor who admits the foregoing willingly enough, although a visit to his classes will find the some old projects and the same methods of teaching he has used for years. Such instructors might have taken recent university courses where new methods were thoroughly discussed or they might have been entertained at a convention or teachers' meeting by an inspiring educational address—all to little or no avail. These instructors tell you they have *their* courses of study which, after all, were old after they had once successfully used them. Successful courses are merely stepping-stones in the right direction toward betterment and progressiveness. When viewed as a means to this end they are extremely valuable, but when viewed as ends in themselves the spirit of progressiveness is denied.

The good instructor is constantly changing his mode of attack, making his work more interesting to his students and to himself. He changes his course of study to meet changing demands, he capitalizes upon his recent readings and courses, he offers new illustrative materials and reference reading, he profits by his past experiences—he is progressive.

Teaching is no place for the laggard who looks back upon past laurels or believes he has reached the place of perfection. Good teaching involves constant study, an open mind for the new, an active desire to improve, and a curiosity to discover a better method for the students above or below the average.

Instructors are either in a rut or are progressive. *To which class do you belong?*

WORK

No man is born into the world whose work is not born with him; there is always work, and tools to work withal, for those who will; and blessed are the horny hands of toil.—*Lowell.*

Drafting-Room Management and Control

T. A. Hippaka, Supervisor of Industrial Education, Madison, Wis.

PART II (Continued)

Student Participation

Opportunities for student participation should be carefully planned by the instructor. Too often teachers become "handy men" in their classes. They attend to everything from picking up scraps of paper to seeing that their charges have their wraps and books. While the teacher is doing these odd jobs he is not instructing, which is his real task. Pupil participation properly organized in every minute detail aids the teacher in increasing his efficiency. Instead of being a participant, the teacher is an overseer when he is not actually instructing. The pupils, too, will be much more interested in the general welfare of the group through participation. The general condition of the shop and its equipment will improve if each pupil feels that he is responsible for it, and the working conditions will be just as advantageous as he wishes to make them. The spirit of ownership may be enlisted by impressing upon the pupils that the drafting room is theirs and not something that belongs to the teacher. It is their home and workshop for a goodly portion of the day and if they so choose they can make it a mighty pleasant place to live in. To carry out the scheme of pupil participation a chief draftsman, an assistant to the chief draftsman, a librarian, a timekeeper, inspectors, a door tender, custodian of keys, custodian of instruments, a materials clerk, custodian of lights, custodian of windows and a utility man may be appointed, each having a specific duty to perform. However, in so doing, the implication is not that these specifically named people are the only ones who participate, but that everyone else is responsible to these appointees for the general welfare of the group.

The chief draftsman should be one of the reliable students. He should be a good student who is thoroughly familiar with the routine duties of the classroom. He must know where the keys are and where materials and special equipment may be found. Each student is responsible to him for his part in keeping the room and its equipment in the best possible condition. The chief draftsman is in turn responsible to the instructor for the general condition of things. The skeptic may wonder as to when this boy is going to do his regular work. The answer is that if the other pupils are carefully selected and properly instructed relative to their various tasks, the chief draftsman's job resolves itself into that of inspection and supervision, all of which can be accomplished within a few minutes.

The assistant chief draftsman also should be a reliable individual, because he must assist the chief draftsman with his duties, and at times act in his place. If the teacher sees fit, he may allow the chief draftsman to select his own assistant.

The librarian is in charge of all reference materials. He keeps a check on all materials taken from the bookshelf on a regular form provided for that purpose. Each pupil is responsible to him for the safe return and good condition of all catalogs, pamphlets, magazines, and books. The librarian sees to it that all materials are neatly arranged and that they are in their proper places in order that they may be readily found. Literature may be checked out for class use or for home study.

The timekeeper has two very important duties to perform. He records all absences on the proper form taking roll by means of the chart on the key panel. It is his duty to inform pupils when to put their work away in case there is no warning bell.

The inspectors, of whom there are six, have very definite functions. Each of the first five inspect one of the five rows of benches. They see to it that each pupil in his row has put his work and equipment away, has locked his locker, has picked up all scrap paper from his table and from the floor around it, has taken his books and wraps, and has left his stool under the drawing table. The fourth inspector checks up on the condition of the blue-print machine, washer, and the long work table and has things put in place if they are not already there.

The door tender is generally an individual with a pleasing personality. His worktable is situated near the door. It is his business to see that the door is kept closed during class time and that it is opened when the class is preparing to leave. When visitors call he ascertains who they are, whom they wish to see, or what they want. The door tender explains to the visitor what the class is engaged in for the moment.

The custodians of keys, of whom there are two, have much to do with the failure or success of the plan outlined in this article. One of these custodians has charge of the locker keys which belong to the pupils. It is his duty to see that each student leaves his key on the panel at the close of the period and that this key panel is carefully locked away in the cupboard. The second custodian of keys is responsible for the locking and unlocking of all cupboards. He unlocks the cupboards early in order that the members of the class may begin work promptly when they arrive.

The materials clerk has charge of all materials. He issues the supplies, keeps a record of them, and collects the money for them from the pupils. Such a task seems like a large assignment, but when we consider that most of the materials are issued at one time during the first week of school, the task assigned to the materials clerk is a very reasonable one.

The custodian of lights attends to the lighting of the room. He properly utilizes every available source of light in order that working conditions may be of the best. It is his business to see that the lights are turned on when they are necessary and that they are turned off when they are not needed. He also adjusts the window shades in order that the natural light will be properly utilized.

The custodian of windows opens windows from the top whenever the weather permits him to do so. Especially is this important during the warm weather. Pupils should have every possible bit of fresh air when it can be provided without producing colds. Windows should not be opened when doing so jeopardizes the health of the pupils.

The utility man is an individual who fits into the general scheme of things especially in the absence of any one of the people who have special assignments. It is his duty to take the assignment of any one of these people when circumstances call for his help and to see the job through.

Various details, if properly and promptly attended to, will eliminate many problems which would otherwise arise in the control of the drafting room. The aim of the teacher in this matter should be prevention rather than control. A little forethought and organization will prevent many embarrassing situations. With every possible precaution taken for prevention, enough correction must still be done. It is much more desirable to pursue a policy of preventing wrongdoing, wasting of time and energy, making mistakes, etc., than it is to apply a remedy after something has happened.

The old adage, "An ounce of prevention is worth a pound of cure," is certainly applicable in this case. The following shows some of the precautions that may be taken:

1. Ascertain the scholastic status and interest of the pupils and place them accordingly.
2. Set them advantageously.
3. Sell your subject to the pupils.
4. Make as few rules as possible.
5. Promote student participation.
6. Create workmanlike attitude.
7. Have on hand an ample supply of working materials.
8. Provide tools and equipment which are in the best possible condition.
9. Give careful attention to the lighting, heating, and ventilating of the room.
10. Provide worth-while tasks which arouse interest and which contain an abundance of instructional material.
11. Evaluate the pupil's work fairly and justly.
12. Promote the proper human relationship between yourself and the pupil.

Ascertaining the pupil's scholastic status and interests is very vital. Both are so closely interlocked that they are here considered together. The progressive teacher will see that each pupil has had the necessary prerequisites for the work he now plans to take. If the pupil is not so prepared, the teacher will advise him accordingly. In every possible instance the pupil should be guided into the course or courses in which he is interested. At other times it is most advisable and expedient that he takes such courses as will prepare him for the thing that he is to do upon graduating or leaving school.

The mere matter of seating or placing of pupils advantageously, aids greatly in the control of a drafting room. Two athletes placed in close proximity of one another may devote too much of their time to discussing their favorite sports. Two hunters may spend a good share of their time discussing their usual pastime. Again, two "sheiks" may indulge too constantly in discussing the relative merits of their numerous girl friends. Occasionally if a poor worker is placed near a good one, provided the latter can stand it, the influence upon the former is very desirable without detriment to the latter. It is very desirable to separate two very good friends. Other suggestions might be offered in this seemingly minor matter, but it is hoped that these few will aid to remind us that a little judgment employed here will make the drafting room a better place in which to work.

Selling your subject or subjects to the pupils should be freely indulged in especially during the beginning of the semester. Each teacher should be a salesman with a very definite sales talk. Frequently during the course, interest must be stimulated and even aroused. The pupil wants to know the "worth-whileness" of the subject he is about to take. He is interested in knowing how and where he can use that which he is about to acquire. The sales talk must open up the broader aspects of the subject. If the subject has been properly sold to the students, they will be easier to control.

The skillful teacher will minimize the making of rules. Rather than post a long list of rules for pupils to observe, the teacher will inform them simply as to what the rules of the "game" are and what is to be expected of them. Then if occasion arises he will treat each individual case on its merits, without shouting across the room and thus giving undue publicity to the case.

Pupil participation as a device for developing a sense of individual as well as group responsibility has already been mentioned. As these phases of responsibility are developed, together with the many by-products that will very naturally result, the control of the group becomes less difficult. Each pupil becomes "a cog in the wheel," conscious of certain duties that he is to perform in order that the machinery may run smoothly.

One of the many functions of the teacher is to create workmanlike attitudes. In order to do this the instructor must have a fair knowledge of practices common in a commercial shop. Students are imitators. When told about the attitudes of practical men, pupils quite naturally attempt to imitate them. Visitations to industrial plants where students may observe men at work will aid greatly in the promotion of proper attitudes.

Adequate and proper working materials should be on hand at all times. Difficulties often met in a classroom can be traced directly to inefficiency in attending to this particular detail. Too often instructors wait until the class arrives before they begin thinking about working materials. This condition should not exist. The teacher should be able to foresee his needs for a considerable length of time in advance and to report such needs to his supervisor giving the latter ample time to have the materials on the job.

Providing tools in the best possible condition is very important. Sufficient tools should be on hand to eliminate all loaning and borrowing, either of which usually results in throwing things around and needlessly moving about the room with such queries as "who swiped my eraser," or "who took my pencil." The effective teacher starts out the very first day with

every pupil fully equipped and he sees to it that each student remains that way. Here again, needs must be anticipated in good season, and such wants made known to the supervisor in due time so that it will be possible to have such materials on hand before school starts or before they are needed. It is one thing to have sufficient working equipment on hand and quite another to keep it in good condition. Pupils cannot work with tools that the instructor would not care to use. Students can be taught to take reasonably good care of their tools. This is one of the teacher's tasks. Where repairs and replacements are necessary, the instructor should give such matters prompt attention. Pupils cannot be happy at their work when it must be done with inadequate equipment or tools in poor working condition. Nor can good work be expected of them under such conditions.

Lighting, heating, and ventilating are so closely related that they are here discussed together. Too often they are neglected, and then we wonder why our students behave as they do. Sometimes poor atmospheric conditions are beyond our control due to lack of planning before the building was constructed. However, this does not prevent us from utilizing to the fullest extent such facilities as we do have. Physical conditions should be made as agreeable as it is possible to make them. Then, and then only, can we as teachers expect satisfactory results from our students, provided other things are equal.

Providing worth-while tasks which are interesting, and which contain an abundance of instructional materials, is one of the chief jobs of the teacher. The problems that are selected should be live ones and must be the kind that will immediately interest the boy. The pupil should always feel that there is an abundance of important and vital jobs ahead of him. Instructional materials closely related to the projects should open up the field as well as clarify the type of work that is being done. The presentation of the latest available material on modern methods should be the goal of every instructor.

A fair and just evaluation of the pupil's efforts certainly plays an important part in the control of the drafting room. Where pupils can labor with confidence that proper recognition will be given them for their efforts, an atmosphere of cheerful industry is more likely to prevail. Nothing is more demoralizing than creating the impression in the minds of children that grading has been unfair. Surely the first step toward just evaluation is that the work be graded consistently with the same measuring stick. For example, accuracy, neatness, speed, lettering, and placement of views, constituted the measuring stick of one teacher for the manipulative side of the work. He was tending toward fairness in that he was grading each piece of work upon the same five points. Then, too, it is a wise plan when grading drawings to arrange them on a large table or surface in the order of the expertness displayed in them starting with the poorest on one end and placing the very best on the other, permitting the remainder to fall between these two extremities. But this constitutes only one half of the story. The pupil should be graded on his attitude toward the work, knowledge of the subject, his general interest, his ability to think out new situations, his initiative, integrity, leadership, and ability to assume responsibility. These are more difficult to evaluate than the first group mentioned. Fairness in evaluating a pupil's ability means that the teacher must consider all of these points carefully and guard against giving a pupil a grade that is too low as well as one that is unduly and undeservedly too high. The pupil should know just what he is being graded on. An unfair low grade lowers the morale of a pupil, while an undeserving high grade has a tendency to make a joke out of the teacher as well as of the work in the judgment of the pupil.

Proper attitudes on the part of the pupils as well as of the teacher are most desirable. Such attitudes as are displayed by pupils are in most part due to the example set by the instructor. If the teacher's answers are abrupt and sarcastic, the student will not care to ask questions or enter freely into discussions, and the general atmosphere will be rather unwholesome. A good example goes much further than constant lecturing. It is quite possible to be a big brother to a group of boys, where the feeling is one of wholesome respect, where free expression is permitted, and where helpfulness toward each other is fostered.

Teachers are usually required to keep numerous records. Such forms as absence sheets, special work slips, grade cards, class rolls, semester grade sheets, library slips, receipt blanks, and special report forms must be attended to. While at times the abundance of such records seems quite unnecessary, nevertheless they should receive attention. Accuracy, care, and promptness are essential. Much injustice is often done to pupils when their records have not been accurately and completely kept in every detail. Although the task may smack of mere monotonous detail which seemingly could be attended to by an office clerk, the teacher should assume this responsibility cheerfully as a very important job worthy of his undivided attention.

(To be continued)

Super-Kites for Radio Broadcasting

E. M. Wyatt, Madison, Wis.

IN the past few years, the world has periodically exulted, worried, despaired, frantically rejoiced, and found fault as it has watched the pioneers of transocean flight dissappear and occassionally reappear over the rims of silent, hungry oceans. In the dark hours of anxious waiting, individuals and newspapers have frequently petuantly railed at the adventurous aviators for not having more generally availed themselves of radio communication. Only those well informed in radio matters, know that the ships with whom the aviator of necessity must communicate, all use long-wave-length transmission. Reception for long-wave messages require antenna of about five hundred feet in length. It is true, aviators can trail such a long

FIG. 1. The four chosen kites being displayed by the flight operator and the author.
FIG. 2. Maylay kites. Notice the bridle of large kite and rear construction of small one.
FIG. 7. The box kite ready to fly.
FIG. 8. The French war kite ready for a coat of airplane wing paint.
FIG. 9. Testing the bridling of a French war kite.
FIG. 10. Listening in over a kite line aerial.
FIG. 11. Kites and reel ready for transportation.

piece of wire behind them while flying, but should they be forced to alight on the ocean where the need of communication becomes desperately important, they are helpless to put up antenna of the required length.

A round-the-world flight is planned to start from the City of Detroit. To help this project along, the author was recently asked to turn his experience in putting on kite tournaments among schoolboys to help solve the problem of lifting the life-saving wire of a stranded aviator. Kites have been experimented with for use on naval seaplanes for raising and carrying antenna, but the results have not been made public, hence, except for the knowledge that it could be done, the problem remains one of research.

Many readers of the INDUSTRIAL-ARTS MAGAZINE have had the same toy kitemaking experience as the author; when a kite flew, the maker congratulated himself, and if it did not, he consoled himself with the philosophy that the joy of anticipation was probably greater than that of realization anyway. But here was a call for kites that *must* fly, with death probable to brave men if they should fail. There were other requirements: they must lift wire of large enough diameter that would not offer too great an electrical resistance; they must stand getting thoroughly wet without injury; they must fly in as wide a range of weather as possible; they should be staunch enough to stand long continuous service; and, finally, they must fold up to occupy little of the precious space available in a plane.

A study of technical literature for engineering data which would help solve the problem, was almost fruitless as far as helpful information was concerned. Proportions for various kinds of kites that have flown successfully was almost the only result. There was almost none of the data that designers of airplanes have available, that would serve as a reliable basis for planning out what would be needed. Therefore, the kites that were finally worked out were built after a good deal of experimentation, trial, elimination, and rebuilding. Exhaustive trials were made and four out of six kites were finally accepted as reliable for their responsible work. Figure 1 shows these four kites.

The initial plans that were carried out provide: That spruce wood would be used for the framework as such wood has been found most suitable for airplane parts; that silk windproofed with airplane wing paint should form the membrane; that kites should be of different sizes, strengths, and kinds to give flexibility to meet varying flying and weather conditions; and that several small kites should be used rather than one large kite as is the practice on U. S. Navy seaplanes.

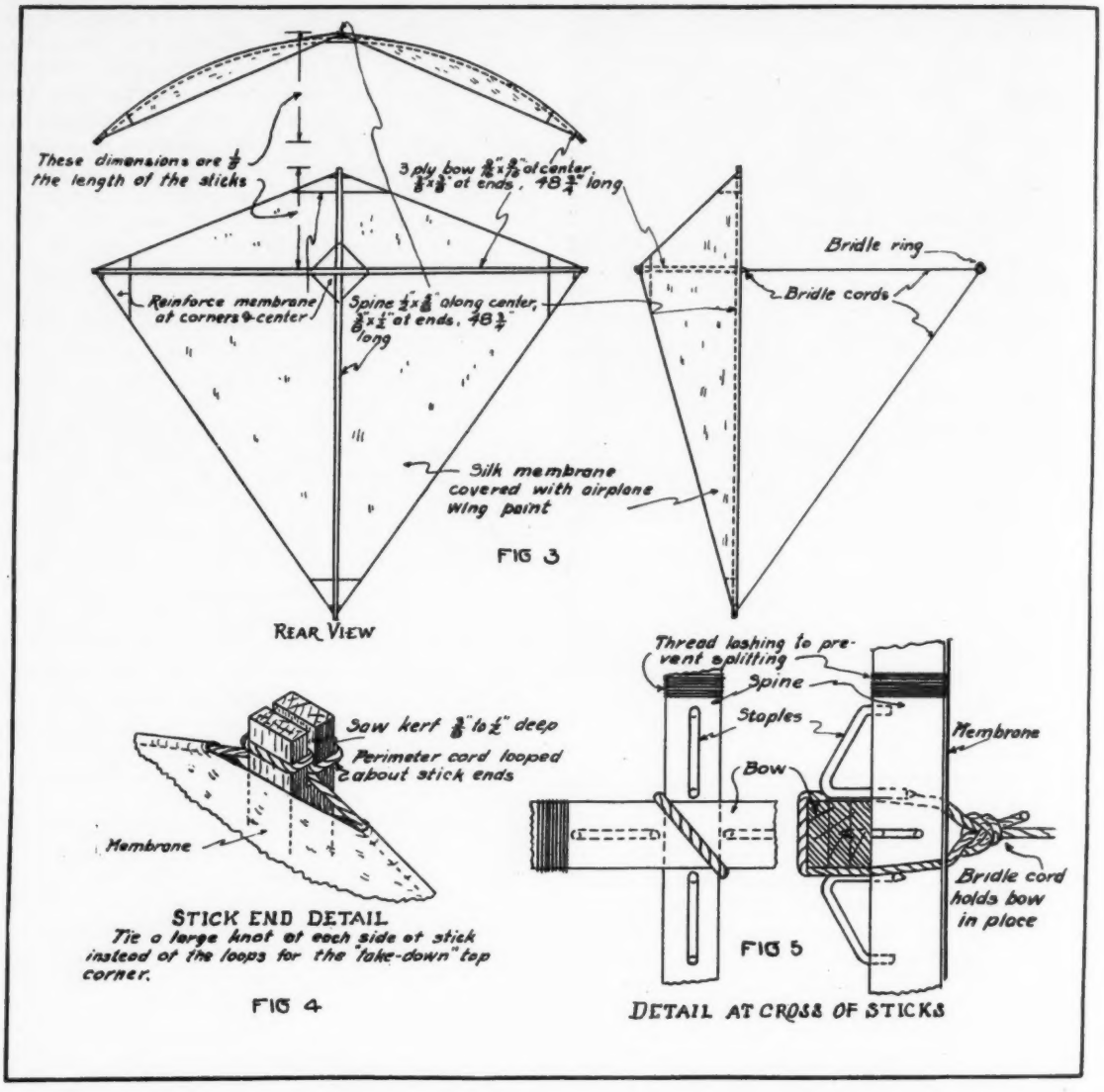
Maylay Kites

Two Maylay or Eddy kites were made to go as part of the plane equipment. These are shown in Figure 2. They were made to collapse by slipping the perimeter string out of the kerf at the top end of the spine and lifting the bow from between the staples at the crossing place on the spine (Fig. 5) where it is held in place by the elasticity of the membrane and by the pull of the upper bridle cord.

The bow piece was bent by gluing up between forms three thin strips as in cross section in Figure 5. This made a much more reliable and stiff bow than those found in the usual toy kite bent by a bowstring. Both bow and spine were lashed by linen thread at the ends and near the staples shown in Figure 5 to prevent any danger of splitting. A coat of varnish served to hold the lashings and prevent moisture from softening the glue.

The perimeter string was made of doubled 22-lb. test sein cord sold as No. 18. It was put on by looping about the stick ends, as shown in Figure 4, except at the top of the spine, drawn snug, and tied. A full-size layout drawn carefully on the floor served at this time and later to keep the kite perfectly symmetrical and the bow ends the proper distance below the top. The strung kite and the floor layout were used as a pattern for cutting the silk by. The warp and woof were run parallel and perpendicular with the bow and spine, and one inch was allowed all around for a casing for the perimeter string. The string was taken off the frame and sewed into the casing on a sewing machine. A hole for the upper bridle rein was cut through at the proper place and this hole and all the corners were reinforced with extra silk on the back side. The membrane and string were put back on the sticks and carefully adjusted so all corners of the kite were exactly in their proper positions.

Silk, without treatment with a filler of some kind, is not windproof enough for kites. After trying several formulas, one was found consisting of cellulose acetate, solvent, and castor oil that efficiently filled the material without stiffening it so that a possible flutter-


These dimensions are 1/8 the length of the sticks
3 ply bow 3/16" x 3/16" at center, 1/8" x 1/8" at ends, 48 3/4" long
Bridle ring
Bridle cords
Reinforce membrane at corners & center
Spine 1/2" x 3/8" along center, 3/8" x 1/4" at ends, 48 3/4" long
Silk membrane covered with airplane wing paint
FIG 3
REAR VIEW
Saw kerf 1/8" to 1/4" deep
Perimeter cord looped about stick ends
Membrane
STICK END DETAIL
Tie a large knot at each side of stick instead of the loops for the "take-down" top corner.
FIG 4
Thread lashing to prevent splitting
Spine
Staples
Membrane
Bow
Bridle cord holds bow in place
FIG 5
DETAIL AT CROSS OF STICKS

ing action would break it. A little lampblack was added to make the kites conspicuous in the air, a consideration that most flyers would consider less desirable than the better-appearing uncolored flyer.

The kites were bridled by two reins as shown in Figure 2. The upper line went through the membrane and looped about the bow and spine as shown in Figure 5. The length of the reins for the location of the bridle ring was determined by trial flights. One author says that these should be such that when the kite is hung downward from the ring the spine forms an angle of 20 degrees with the ground. Another states that the proper length of reins is such that when they are pulled sideways against the kite the bridle ring will just touch the end of the bow. These rules of thumb are helpful to start by, but the author's experience is that the result of patient trying is the only way to fix these important proportions.

These kites fly without tails and are especially efficient in light breezes. They are very sensitive to any lack of absolute balance and symmetry, hence a good deal of care had to be exercised that the bow balanced exactly on its center, that the sticks were crossed exactly at right angles, that the silk was cut and applied symmetrically, and that the corners were firmly held in place by the perimeter string. The folding arrangement was especially simple and efficient.

Box Kites

The bow or Hargrave kite is an especially reliable kite in heavy winds and is easily launched with a short line, so one of these was included in the assortment. It was not quite so simple to make this kite fold up as the Maylay, but it was accomplished by making the forked cross braces within the cells so they would easily slip out and permit the cells to collapse.

Most of the details of construction incorporated in this kite are given in Figure 6. A photo of the finished kite is given in Figure 7. The spine sticks were made untapered and with shallow notches on one side at the ends as explained in the note in Figure 6. They were varnished before being attached to the silk. The four cords to bound the cells were tied exactly in 64-

in. loops by overlapping half-hitch knots. The two pieces of silk were cut 12 by 65 in., so that with a 1-in. seam and casings they were 10 by 54 in. in circumference when sewed up. The cords were sewed into the casings, not drawn in. The silk bands were sewed or lashed to the sticks by heavy linen thread passed by a needle around the sticks, through the silk, and about the cords in the casings. It was found that sewing the diagonally opposite sticks at the same time helped to get the bands on without diagonal strain on the membrane, and so the dimensions were correct. The cross braces were cut to length to fit after the silk was on the spine sticks. It was not found necessary to fasten the cross braces in place as the elasticity of the membrane held them firmly in place. The cross-tie cords shown in the drawing and photo were tedious to put on so as not to draw the frame out of square. A large framing square was used constantly during this operation. One end of each cross brace was tied with a short line to one of its corresponding spines so it could not be lost when the kite was collapsed. When the parts were all assembled the membrane was given a coat of airplane wing paint as was done with the Maylay kites. The bridling proportions seem to be less important than on Maylay kites, except that the lengths right and left must be exactly equal. A yardstick was found to be an efficient help to secure this. The top and bottom reins were found to be about right when the spines form an angle of about 20 degrees with the flow when hung downward from the bridle ring.

This kite proved to be a steady reliable flyer and able to stand a hard wind because of its efficient cross bracing and tying. It folded quite compactly but had to be handled carefully in setting up or taking down in a wind to keep from breaking the forks of the cross braces. It could always be counted on to lead up a string of tandem kites without plunging to the ground in the eddies near the surface.

French War Kite

The French war kite is evidently a cross between the Maylay and the box, and possesses largely the qualities of both. For the length of its sticks, it carries twice the lifting membrane of either of the two from which it evidently originated, and this consideration insured that one of the kites for the flight should be a French war kite. It is quite a difficult kite to make but those who have made them usually prefer them to all others. It is easy to bridle and is as reliable as a box kite.

Figure 8 shows the French war kite made for the flight and Figure 12 shows the details of its construction. The box-kite part was made like the rectangular box kite previously described, except that the cells were equilateral triangles in cross section, figured from the center of the sticks. The wings were sewed on their inner edge to the membrane of the cells, and between

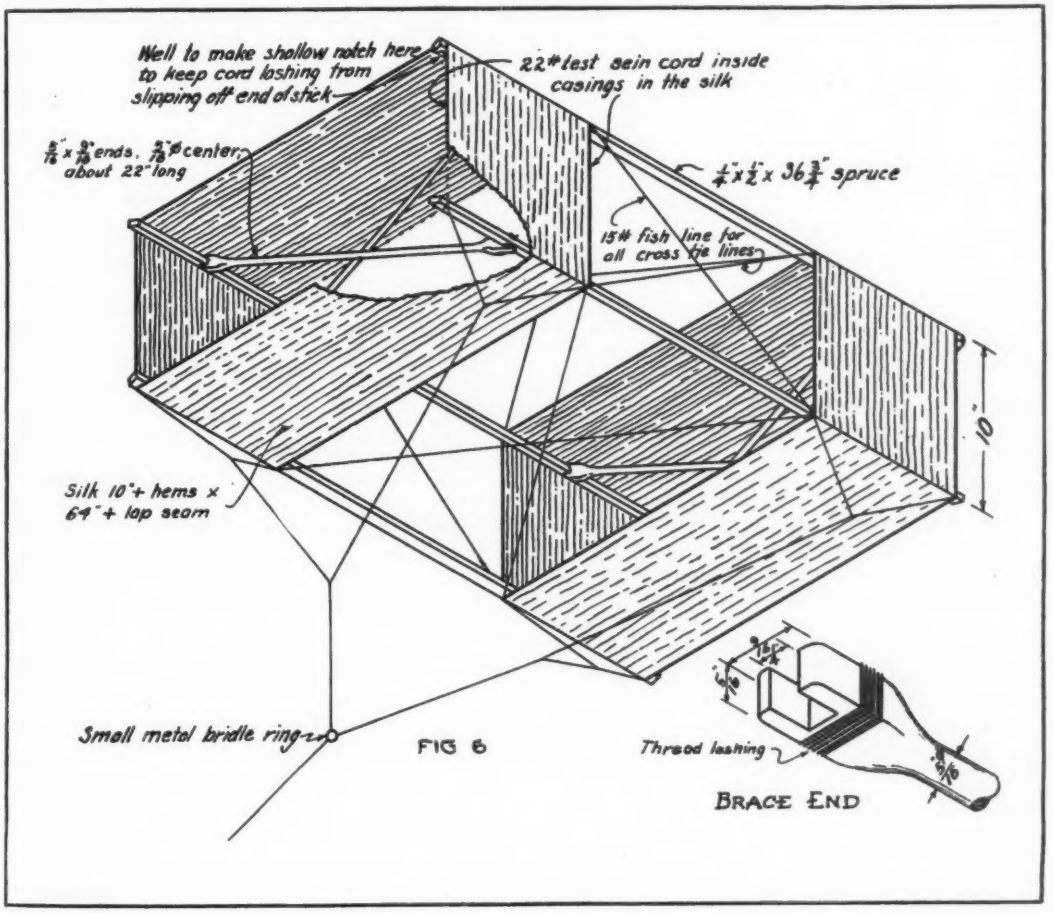

Well to make shallow notch here to keep cord lashing from slipping off end of stick
22# test sein cord inside casings in the silk
1/16"x 5/16" ends, 5/16" center, about 22" long
1/4"x 1/2"x 36 3/4" spruce
15# fish line for all cross tie lines
10"
Silk 10"+ hems x 64"+ lap seam
Small metal bridle ring
Thread lashing
BRACE END

FIG 6

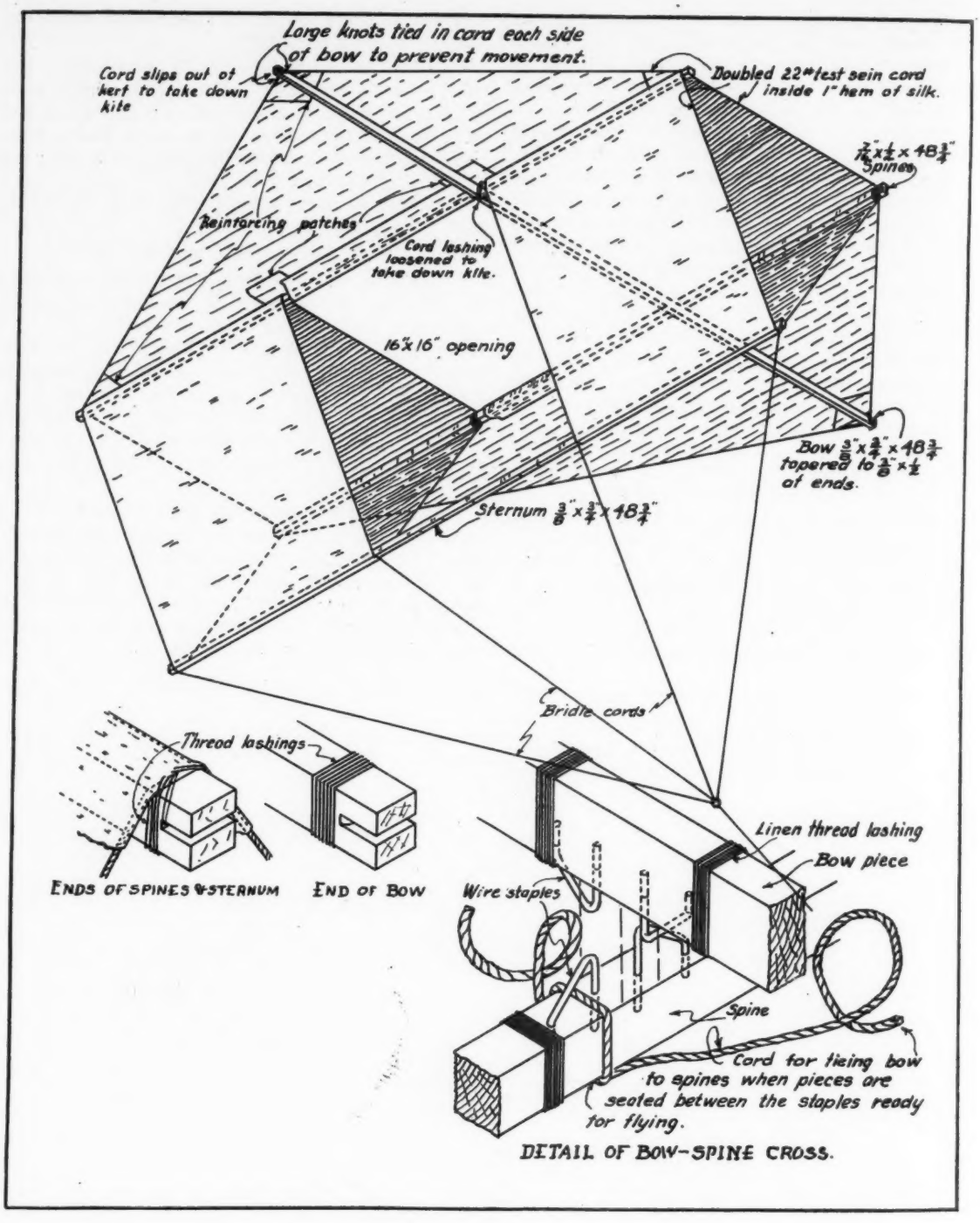

Large knots tied in cord each side of bow to prevent movement.
Cord slips out of kerf to take down kite
Doubled 22# test sein cord inside 1" hem of silk.
Reinforcing patches
Cord lashing loosened to take down kite.
16"x16" opening
Bow 3/8"x3/4"x48 3/4" tapered to 3/8"x1/2" at ends.
Sternum 3/8"x3/4"x48 3/4"
Bridle cords
Thread lashings
Linen thread lashing
Bow piece
Wire staples
Spine
Cord for tieing bow to spines when pieces are seated between the staples ready for flying.
ENDS OF SPINES & STERNUM
END OF BOW
DETAIL OF BOW-SPINE CROSS.

FIG. 12

the cells to the spines; on their outer edge, they were hemmed about a doubled perimeter string similar to the construction used for the Maylays.

As in making the Maylays, a full-size layout was used as a pattern for cutting the membrane and for checking up the dimensions and shape. The center lines of the spines were placed 16 in. apart and the bow the same distance from the top of the spines. The triangular cells are held open by the pull of the kite.

The dimensions for the four sticks are given in Figure 12. The staples shown in the detail of the bow-spine cross were used as part of the device for collapsing the kite for transportation. These sticks were lashed with linen thread near the staples to prevent any possibility of the pieces splitting. The kerfs at the ends of the bow were lashed in the same way. The ends of the other sticks were not lashed, as they get sufficient lashing when the silk is sewed on.

The cells for the box-kite part were made after the frame was finished. The four cords to bound the cells were tied in loops which measured exactly 49¾ in. The silk bands were cut to 20 by 50¾ in. and when sewed with 1-in. hems and seams measured 18 by 49¾ in. The cord loops were sewed, not drawn, into the hems. Two pencil lines were drawn 16 in. apart to mark the seam lines where the wings were to be sewed on later.

The shape of the silk for the wings was taken directly from the full-size layout. One inch was allowed for the hem for the perimeter string and for the seam where the wings were sewed to the triangular cells; 3 in. were allowed for a flap to go around the spine between the cells. The warp and woof were run parallel with the sticks and care was taken not to stretch the bias seams. The hem for the perimeter string was sewed double, the wings sewed to the cells on the pencil lines previously laid out, and the reinforcing patches, shown in Figure 12, sewed on. Trial of other means proved that making the entire membrane assembly before putting it on the frame was better than trying to fit it on piece by piece, but it required careful laying out and working to dimensions.

The assembled membrane was strung with a line of the perimeter cord and stretched in place on the frame. This string was drawn tight, the whole placed over the layout, and the proper position of the corners marked on the perimeter string. Then a second line of the perimeter cord was run through the hems and looped or knotted to hold the stick ends in their proper places. When this was finished the cords bounding the cells were lashed to the spines and sternum with heavy linen thread. The last part of the assembling was to sew down the flap of the wing between the cells to the spine. The latter had to be done by hand; all the other sewing had been done on a machine.

Test of the efficiency of the provisions for taking down the kite were made at this time. It was found that by loosening the cords and tying the crosses in the sticks together, the bow could be bent enough to loosen the perimeter cord from the kerf at the end of the bow and the whole thing collapsed so it could be rolled up and stored in a paper tube.

The fully assembled kite was then windproofed. The bridling was tentatively adjusted by hanging as in Figure 12 so that the spines made about an angle of 20 degrees with the floor.

The French war kite was the favorite with every person that had a hand in making and trying the kites out. It flew on a 22-lb. test line. In a good wind it easily carried up the antenna wire we experimented with, and in a hard wind was more than one man could possibly reel in without help.

Kite-Flying Tips

Out of the experiences recounted and others, the author has gleaned bits of kite lore that might well be passed on to the industrial-arts readers who have persevered in reading through this article up to this point.

One of the points most firmly impressed, is that wire for a kite line is a dangerous thing in the neighborhood of power and telegraph lines. The author will never forget the fireworks, anxiety, and havoc that occured when a runaway string of kites trailed a wire across an electric circuit which was strung across the distant landscape. Above all, never use a wire in the city.

Having made, and supervised the making of a great many kites, has convinced the author that the greatest cause of failure in kitemaking is lack of symmetry. The proportions published for various makes of kites can usually be varied quite a little, if the sides are kept exactly symmetrical. A whirling kite is almost invariably unsymmetrical. The lack of symmetry may simply be in the bridle but it is more often a lack of accurate measurement in placing the perimeter string, or carelessness in pulling the membrane more on one side than on the other.

The best all-around membrane for paper-covered kites is brown wrapping paper. Paste is superior to glue in applying paper. Sein cord is the cheapest good-quality kite line for the ordinary size kites. It comes in varying sizes and is usually readily procurable. Spruce is probably the best all-around wood for kite sticks, though white pine, ash, and oak are good. Split bamboo is ideal for the framework of some varieties of kites, especially for light-wind fliers.

Several small kites will provide more sport than one large one. Two kites can be flown side by side on lines of equal length without their interfering with one another. Several can be flown tandem on the same cord by giving each a short line of its own. In this way men have been lifted and miles of line sent up in high altitude exploration. A kodak can be safely supported on such a line and bird's-eye pictures made by setting its shutter to be operated by a rubber band held and timed by an acid-soaked bit of string.

There are great unrealized opportunities, for sport and useful work with kites, besides the challenge which they offer to the tinkering hands and the imaginative minds of men.

Getting More Use Out of the School Shops

James F. Kieley, Poughkeepsie, N. Y.

THE question of how much school shops should be used, even if considered only from the standpoint of the monetary investment they represent, has, it would seem, but one answer, and that is: to make their facilities accessible to the boys of the community as many hours per day and as many days per week as possible. Shops cost money, money must be invested wisely, and the dividends which come as the result of the purchase of materials and instruction for the boy of impressionable age, certainly make this particular form of speculation, if it may so be termed, a gilt-edged venture in the business of educating youth.

Poughkeepsie, N. Y., which almost since its beginning has been a community where educational institutions of the highest order have developed and sent their voices throughout the world, is making this venture with the determination that its influence shall be pushed into the very corners of the city to seek out every boy and give him an equal chance to make full use of a rich investment in school shops.

The boy of 10 or 11 years who is approaching adolescence is entering upon that period of life when he does not quite know what to do with himself. It is a time when he is no longer attracted by or interested in childish diversions. A desire to work, to build and to achieve is becoming manifest within the individual. It is a time of thinking along new lines, of examining, of evaluating and of self-inspection. He is growing.

This is the time to take the boy in hand; to give him some tools, show him how to build, and reward him for merit which is justly deserved. It is a good time to teach him how to work beside others, how to conduct himself in contests—how to accept victory and defeat.

How can a movement or campaign for use of the shops more hours a day, more days a week, be successfully carried out? First, the educational department of the city must be active; second, the community must be interested. This, it must be kept in mind, is an extracurricular project.

Poughkeepsie's venture is intended to benefit principally the seventh- and eight-grade boys and was instituted by Mr. Robert Decormier, director of industrial-arts work in the public schools. The board of education has been approached by both Mr. Decomier and Mr. Frank V. Mylod, chairman of the Boys Work Committee of Lafayette Post No. 37 of the American Legion, representing a civic interest, and they obtained its consent to cooperate. A canvass of the schools has given the astonishing information, however, that more than 600 boys in the seventh and eighth grades alone are anxious to take advantage of the offer of after-school instruction in shopwork and the board has found it impossible, because of financial limitations, to put the project under way this year. Next year it is hoped to see the plan financed by including a special sum in the city budget.

The disadvantage of lacking the funds with which to obtain instructors has not prevented the leaders, however, from making the most of the response which they received from the children, and the boy movement has been started as a community enterprise. The first step was to organize a boys' hobby club and this was done under the auspices of the American Legion. A small group of boys is being brought together weekly for talks on nature study, games, story telling, and individual hobby discussions. Next, the press was interested and as a result the first event by which the merit of the work could be demonstrated to the public was carried out when the American Legion and The Eagle-News, a morning newspaper, cooperated in conducting a kite-flying contest. This was recently staged on College Hill, a beautiful park high above the city, from which is viewed the Hudson River on one side and the distant Berkshires on the other.

The value of this contest was evident when the children, breathless and eager to exhibit their handiwork and demonstrate the ability of their homemade kites to fly, assembled on College Hill, on a beautiful spring afternoon. One of the most enthusiastic entrants was a girl, who, although the contest had been announced as open only to boys, was permitted to participate. Each child was given a ball of string containing seventy yards and when he had let that out, was given another seventy yards. In this manner was calculated the distance which the kites flew.

Made in all shapes and colors, some with tails, some with fringe, the kites presented a pretty spectacle and the faces of the contestants glowed in delight mingled with pardonable pride as the kites took to the wind and sailed off over the suburbs lying far below. Here was an opportunity for each child to see the success of his labor and also to pit his skill both in building and handling a kite, against that of others whom he knew had no advantage over him in any way.

When the contest was over, the prizes, inexpensive but desirable from the point of view of a boy, were presented with due ceremony and everyone went home happy. It was an event to be talked about for many days to come.

Such is the value of teaching boys how to build, how to play, how to make use of the talent they possess by means of knowledge of the tools and equipment by which their ideas may be put into being. There is a sense of satisfaction derived from being able to handle and show to others the product of one's mind and hands. But the mistake must not be made of assign-

UPPER—THE CONTESTANTS
LOWER—TIME OUT FOR NECESSARY ADJUSTMENTS

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(Cut stereographs apart and mount on cardboard)

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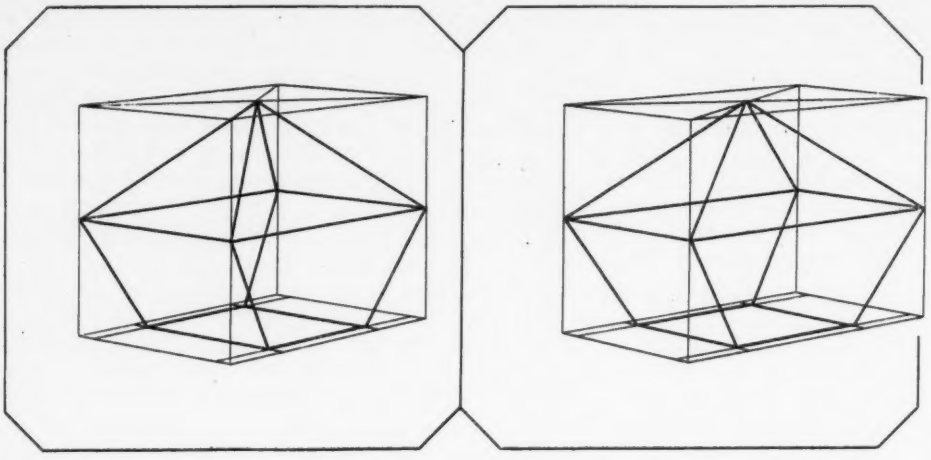

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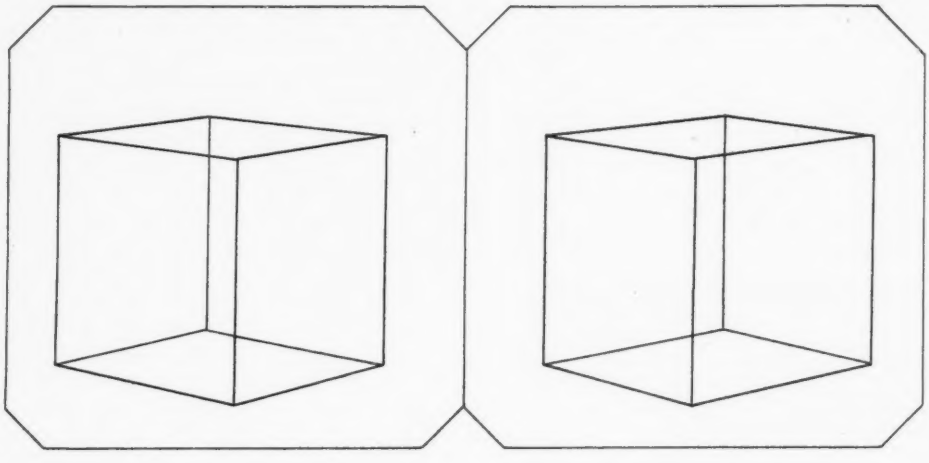

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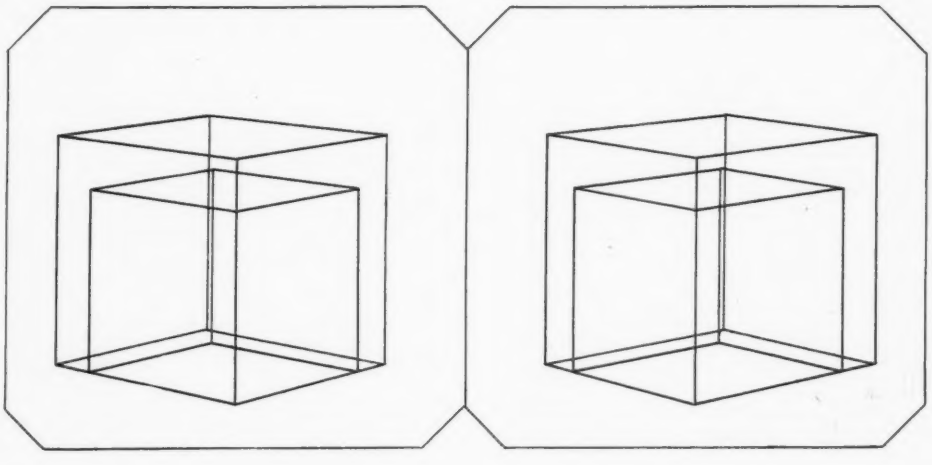

Designed by Frank W. Walsh, Oshkosh, Wis.

For Description See Page 149, Industrial-Arts Magazine, April, 1929.

TRACING SUPPLEMENT No. 130.
THE INDUSTRIAL-ARTS MAGAZINE.
APRIL, 1929

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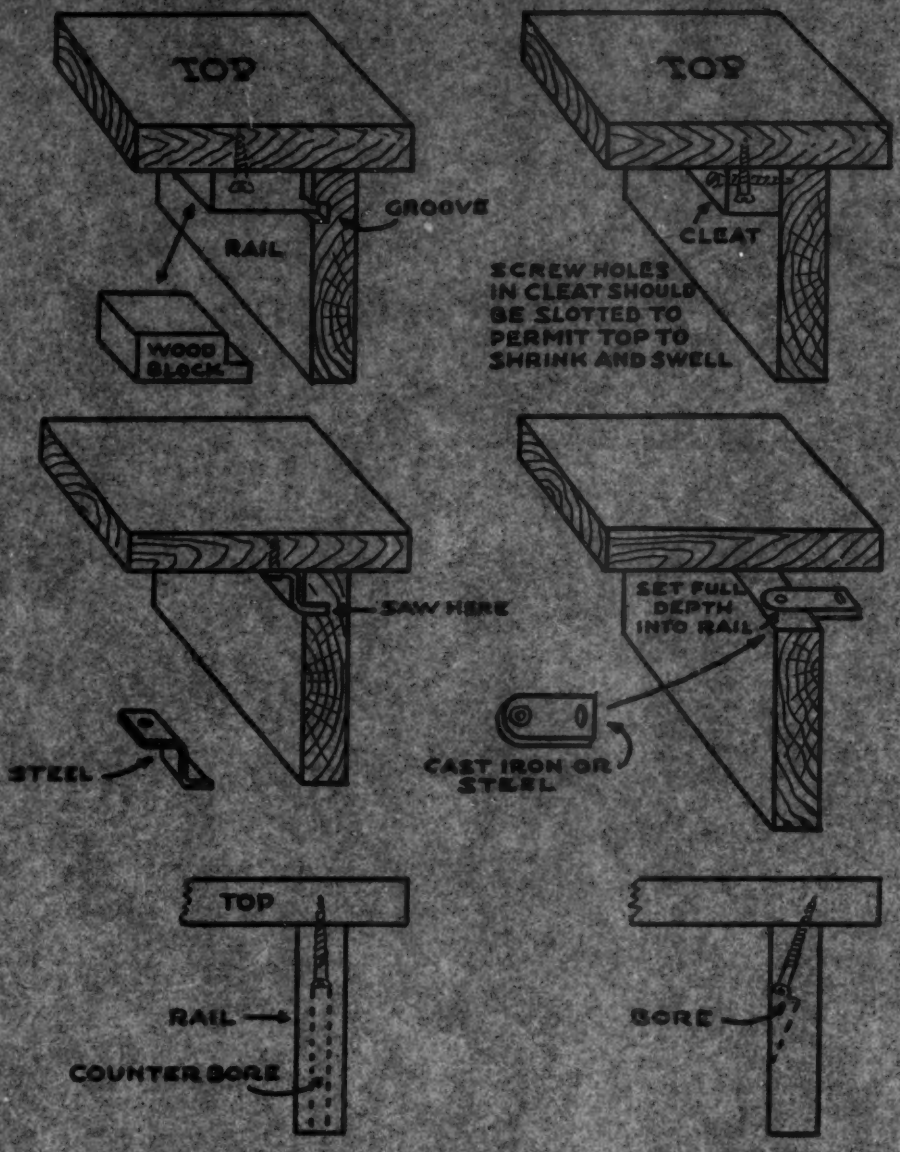
INSTRUCTION SHEET

Methods of Fastening Table Tops



THE GRAIN IN THE TOP OF A TABLE RUNS THE OPPOSITE DIRECTION FROM THE GRAIN IN THE END RAILS, THESE CANNOT BE FASTENED TOGETHER EXCEPT IN SUCH A MANNER AS TO PERMIT THE TOP TO COME AND GO. OFTEN PIECES OF FINE WORK ARE SPOILED BY NOT OBSERVING THIS LAW OF CONTRACTION AND EXPANSION OF WOOD.

Designed by J. I. Brown, Miami, Florida.

For Description See Page 150, Industrial-Arts Magazine, April, 1929.

TRACING SUPPLEMENT No. 131.
THE INDUSTRIAL-ARTS MAGAZINE.
APRIL, 1929

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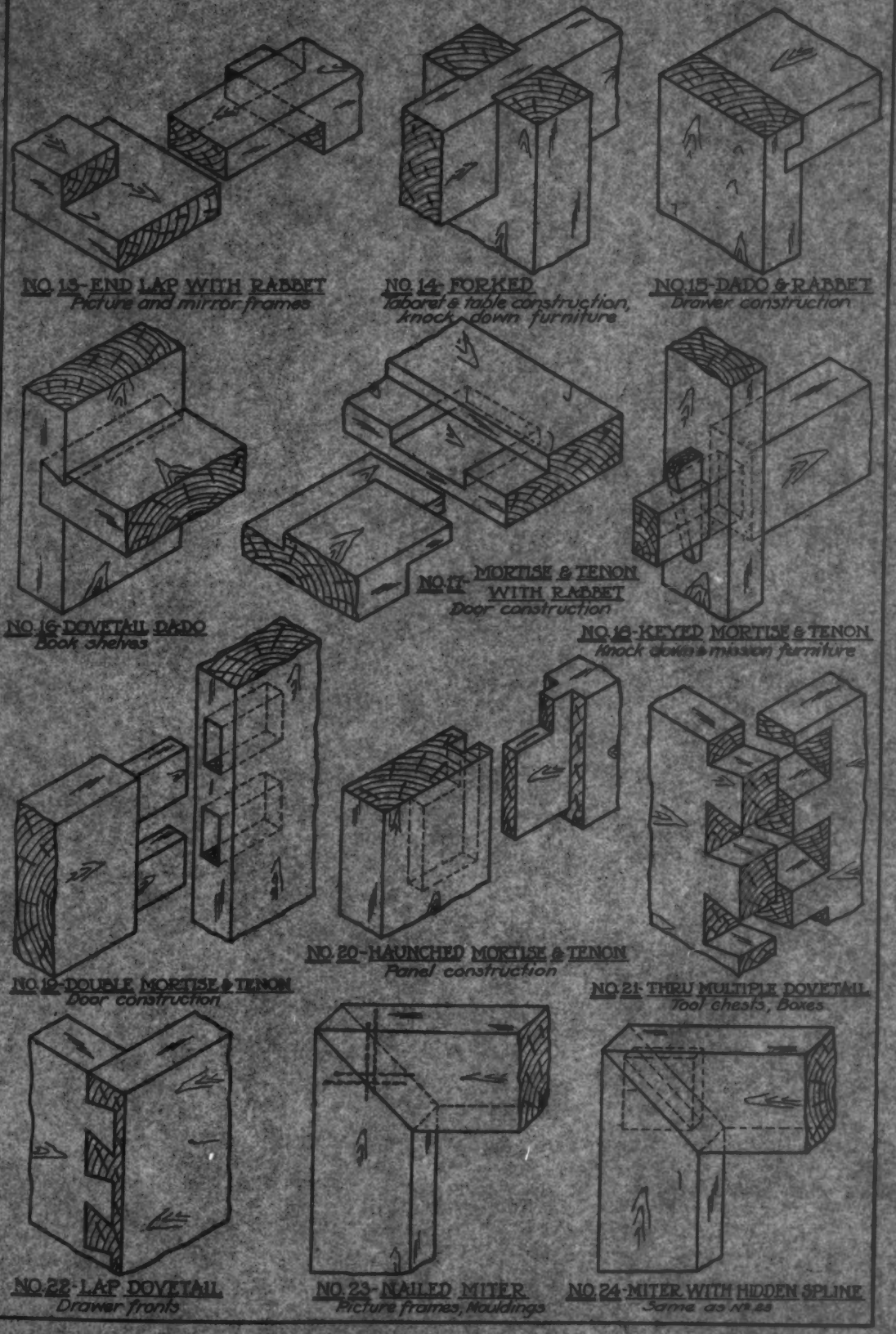
— JOINTS COMMONLY USED IN CABINETMAKING —



NO. 13 - END LAP WITH RABBET
Picture and mirror frames

NO. 14 - FORKED
Taboret & table construction, knock down furniture

NO. 15 - DADO & RABBET
Drawer construction

NO. 16 - DOVETAIL DADO
Book shelves

NO. 17 - MORTISE & TENON WITH RABBET
Door construction

NO. 18 - KEYED MORTISE & TENON
Knock down & mission furniture

NO. 19 - DOUBLE MORTISE & TENON
Door construction

NO. 20 - HAUNCHED MORTISE & TENON
Panel construction

NO. 21 - THRU MULTIPLE DOVETAIL
Tool chests, Boxes

NO. 22 - LAP DOVETAIL
Drawer fronts

NO. 23 - NAILED MITER
Picture frames, Mouldings

NO. 24 - MITER WITH HIDDEN SPLINE
Same as No. 23

Designed by John F. Faber and Jonathan Bright, Erie, Pa.

For Description See Page 150, Industrial-Arts Magazine, April 1929.

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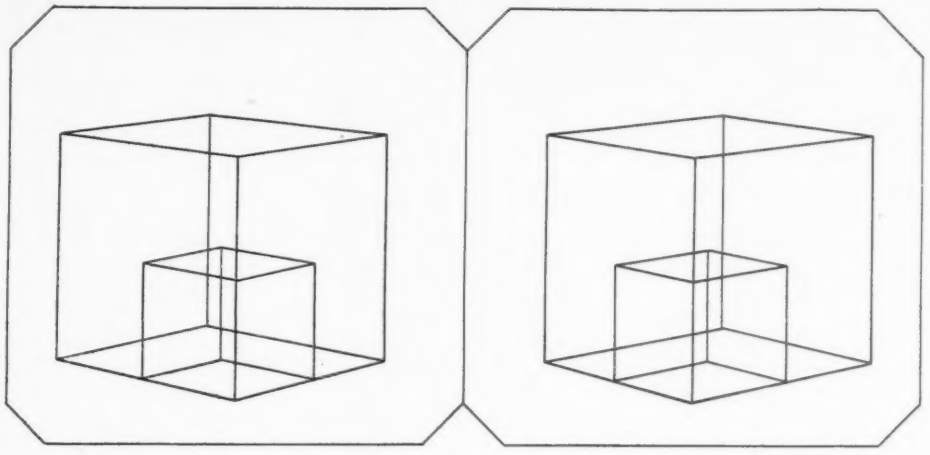

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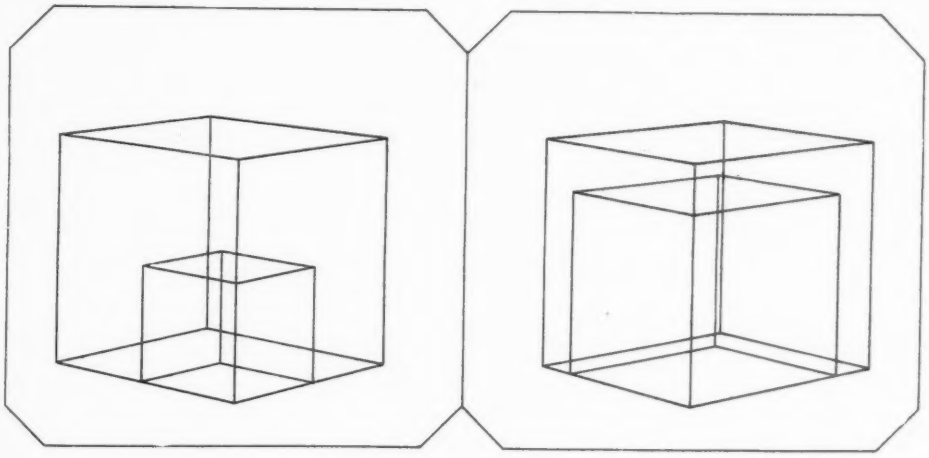

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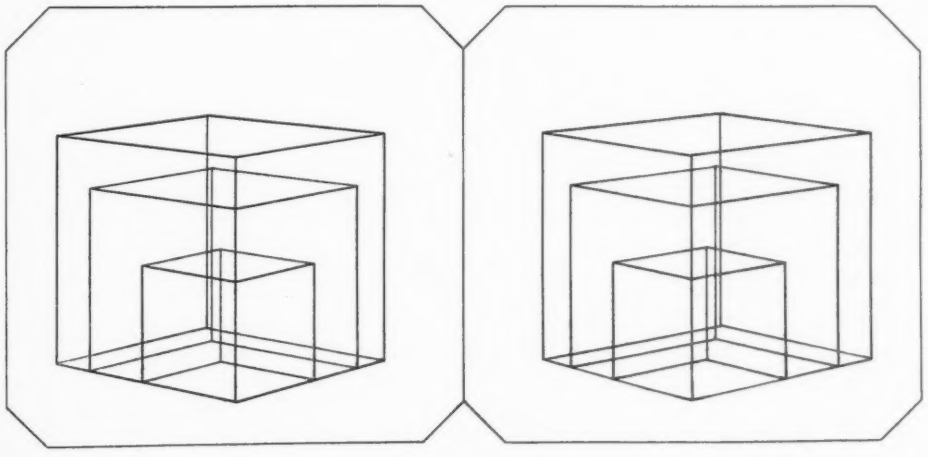


(Cut stereographs apart and mount on cardboard)

Designed by Frank W. Walsh, Oshkosh, Wis.

For Description See Page 149, Industrial-Arts Magazine, April, 1929.

ing projects to boys of 10, 11, and 12 years, which are impossible of full accomplishment by them. Putting a boy of that age to work on such a thing as a model airplane, for instance, which would require delicate balancing in the construction, and skillful handling in the flying, would be almost certain to result in his eventual abandonment of the job and loss of interest in the work as a whole.

The third major step in the venture was to seek out boys who were interested in boatbuilding and sailing. Again, the response was surprising. Not only were dozens interested, but many had already built model boats and some had built very good models. Mr. Decormier suggested to the boys that they have a model yacht club, and twenty of those who had boats or were building them were accepted for charter membership. This brought in another civic interest when Commodore David F. Lane of the Poughkeepsie Yacht Club consented to assist the boys in forming their club and also to sponsor the group, which was organized along the same lines as the yacht club.

This club also was responsible for identifying two more important departments of the community organization with the boy movement, namely, the Children's Court and the Adriance Memorial Library. The library is lending particularly valuable aid by assisting in the collection of books on model boatbuilding and also providing good space for exhibits with which it is hoped further to interest the public. Mr. George Polk, a builder of model boats for many years, has volunteered his personal instruction at club meetings. He has given the boys much valuable information about the proper balancing and rigging of their simple models, in order that their boats would be more efficient sailers.

Each boy in the club was expected to improve his model or built himself a new boat by June 16, at which time a regatta was held, and prizes were offered for the various classes of races. This again was providing the boys with an opportunity of enjoying the fruits of supervised and directed labor.

And so the movement, since the first of the year, has gained a momentum which is accelerated as week by week the project reaches out and gathers in a larger and more heterogeneous group of boys. Already there are represented in it every public and parochial school.

At present, with the school shops open only to boys taking the regular courses one hour a week, the extra-curricular work is being given a sound foundation. Next year, with a necessary sum in the city budget, the board of education will engage the necessary number of instructors and the shops will be thrown open, it is hoped, every afternoon and on Saturdays. And the slogan is, and will be, "Shop advantages for more boys, more hours per day, more days per week."

Stereographs as Teaching Devices in Drawing Classes

Frank W. Walsh, State Teachers College, Oshkosh, Wis.

(See Supplements Nos. 132 and 133)

FREQUENTLY students in drawing classes find visualization very difficult. The student in many cases does not comprehend that the lines which he is drawing, actually represent the edges of a solid. As far as he is concerned, the lines that he draws are simply marks made by his pencil point. To him the lines simply appear as lines drawn with the ends attached to each other or as a crisscross. After the student once sees or visualizes that the lines represent the edges of solids, he understands his subject and the problems much better. He cannot help but see these lines as edges of solids when viewed through a stereoscope.

Cut out stereograph Number X and place it in the stereoscope, focus the views so that they appear as one to the eyes. You will notice that the lines now stand out from each other and do not touch each other except at the ends. Where lines cross, one appears a distance behind the other. The third dimension or depth is shown. This may aid a student in his understanding of the meaning of lines as representing the edges of solids in drawing.

To Compare Size with Scale in Drawing

Another lesson which is hard to show and to understand in drawing, is the difference between size and scale. Whenever we speak of size concerning a thing we cannot help but think of its volume, that is, its cubical contents. This seems to be the accepted understanding of size. Size and scale mean the same thing to many people. By use of stereographs, this comparison or relationship of size and scale is easily shown.

By referring to stereograph No. 1, you will notice that the solid represented is a 1½-in. cube. Now place stereograph No. 2 in the stereoscope. Notice that another cube is drawn inside of the one shown in stereograph No. 1. This smaller cube is exactly one half the volume or size of the larger cube.

Now place stereograph No. 3 in the stereoscope. You now notice that the smaller cube is much smaller than the one shown on stereograph No. 2. This smaller cube is drawn to one half the scale of the 1½-in. cube. All of its three dimensions are shortened to one half the lengths of the larger cube. It can be readily seen that the smaller cube is only one eighth the size of the large cube.

Now, to compare the cube one-half size with the one drawn to one-half scale, place stereograph No. 4 in the stereoscope. Close both eyes when the stereoscope is first placed over the eyes, then open the right eye and you see the large cube with the one that is one half its size inside of it. Close the right eye and open the left, you now see the small cube that is drawn to one-half scale inside of the large cube. Now open both eyes and you see both cubes in place inside the large cube.

To clarify the two cubes within the large one, place stereograph No. 5 in the stereoscope. The three should now stand out so that their true relationship can be seen.

PROBLEMS AND PROJECTS

This department aims to present a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in woodworking, turning, patternmaking, machine-shop practice, sheet-metal work, forging, foundry work, auto mechanics, auto electricity, electricity, architectural and mechanical drafting, printing, bookbinding, concrete work, farm mechanics, home mechanics, and other lines of industrial-arts work are desired for consideration.

SPECIAL INSTRUCTION SHEETS

J. I. Sowers, Director of Vocational Education, Miami, Florida

(See Supplement No. 130)

In working up our course of study and projects for use in the wood shop, we decided to include a number of special instruction sheets. These sheets are bound in the folio of blue prints for the projects, and in contrast to the usual instruction sheets, which are mimeographed, they are for the most part in the nature of instructional drawings intended to develop the thought of the student in certain methods of construction, by offering him various ways of doing certain work, or by showing in detail approved methods of work and structure.

Supplement No. 130, entitled "Methods of Fastening Table Tops" shows one of these sheets. There are others on drawer construction, methods of making drawer pulls, case construction, panel work, etc.

These instructional drawing sheets in no way take the place of the regular individual instruction sheets, but are introduced into the course as teacher aids when problems of construction come up for immediate solution in the working out of a project.

These graphic instruction units have proved so helpful that it is planned to extend their use by adding more details of this nature in the course. The best thing about them appears to be that they are bound right in with the blue prints of projects and adjacent to the project drawings in which their application occurs.

CABINETMAKING JOINTS

John F. Faber and Jonathan Bright, Erie, Pa.

(See Supplement No. 131)

The chart of cabinetmaking joints is to supplement the chart of "Elementary Woodworking Joints" which was published in the December, 1928, issue of the INDUSTRIAL-ARTS MAGAZINE. The cabinetmaking student should be familiar with the joints given on the two charts.

The places where the joints are commonly used are given under the name of each joint.

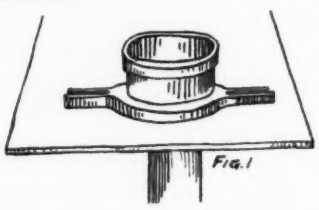
TYPICAL EXAMPLES FOR THE PLUMBING SHOP

Fred W. Megow, Cheltenham Township Public Schools, Wyncote, Pa.

Job Sheet No. 1

The Job: To use the soil-pipe rest.

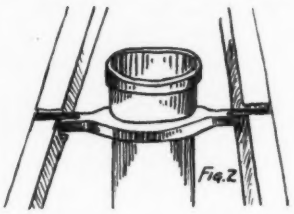
Reason for the Job: When roughing in soil pipe, it is necessary to support it at various places. For this purpose the soil-pipe rest is used.



Procedure: When the rest is used as shown in Figure 1.

1. Cut the hole for the soil pipe. If 4-in. soil pipe is used, cut the hole about 5 in. in diameter.
2. Place the rest over the hole.
3. Slide the soil pipe through the rest.

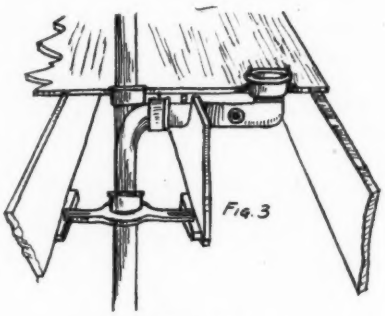
When the rest is used as shown in Figure 2.



1. Lay the rest across the joists and mark the location. Cut out the notches in their proper places with a chisel.
2. Place the rest in these notches.
3. Slide the soil pipe through the rest.

When the rest is used as shown in Figure 3.

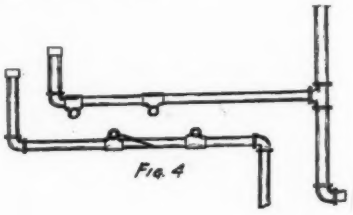
1. Locate the center of the soil-pipe line on the joists.
2. Nail brackets to the joists so that the center of the bracket is in line with the center of the soil pipe. Use spikes for nailing on these brackets.
3. Put the rest on the soil pipe and slide the latter in place.



Job Sheet No. 2

The Job: To install the supply pipes for a two-part laundry tub.

Information: New style laundry-tub faucets do not require the installation called for by the old-style laundry tubs. Nevertheless, it is still necessary to know how to install the supply pipes for the old types of tubs. This job sheet shows how this is done.



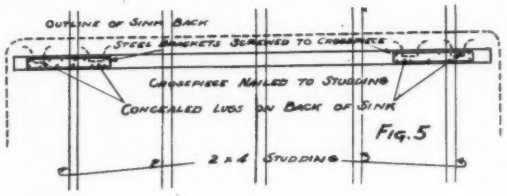
Procedure:

1. The hot-water pipes must be run as shown in the diagram, with the laundry-tub tees turned down. The reason for this is that the tees will not act as traps. They should face in and be placed opposite the holes in the tray.
2. The cold-water pipes should be run with the laundry-tub tees turned up. These tees should face in, and be oppposite the holes in the tray.
3. Two short pieces of cap pipe shown in the diagram must be placed on the ends of the hot- and cold-water supply lines to act as air chambers. The object of these cap pipes is to prevent rattling in the pipe when the water is sudenly shut off at the faucet.

Job Sheet No. 3

The Job: To install a kitchen sink.

Reason for the Job: The kitchen sink is a most important fixture and its position in the room should be carefully considered.


OUTLINE OF SINK BACK
STEEL BRACKETS SCREWED TO CROSSPIECE
CROSSPIECE NAILED TO STUDDING
CONCEALED LUGS ON BACK OF SINK
2 x 4 STUDDING
Fig. 5

Procedure:

1. Fastening the hangers.
   a) For new work.
   Two steel wall hangers are shipped with each complete sink. The lugs on the back of the sink fit into projections in these wall hangers. The hangers are concealed when the sink is in place, but because they must bear the whole weight of the sink, they must be fastened very securely to the wall. Preparatory to fastening them, place the sink temporarily against the wall at the exact height and position which it is to occupy. Mark the outline of the sink on the plastered wall with a pencil. For new work it will be found that a board has been placed into the plaster when the wall was roughed in. The hangers are fastened securely to this board.
   b) For old work.
   Before fastening the hangers, a 1 by 4-in. pine board, cut just long enough to fit inside the back of the sink without interference, must be securely nailed to the studding, in the right position to hold the hangers. To do this, the plaster must be cut out and the 2 by 4's notched slightly so that the board, when fastened into place, will be flush with the plastered wall.
2. Hang the sink by hooking the lugs at the back into the socket of the hangers that have just been attached to the wall.
3. Install the trap by screwing it into the waste-pipe tee in the wall. Connect the other end of the trap to the nipple of the tailpiece that comes through the sink, by means of the union nut on the inlet end of the trap. This completes the waste connection.
4. Install the faucets. Take two ½-in. nipples, long enough to extend about ¾ in. beyond the sink back, when they are screwed into the supply-pipe tees. The faucets are then screwed onto these nipples until the flange of the faucets rests snugly against the sink back.
5. Ask the instructor for information required to fasten the sink strainer in place.

MAGNETIC LOUD-SPEAKER

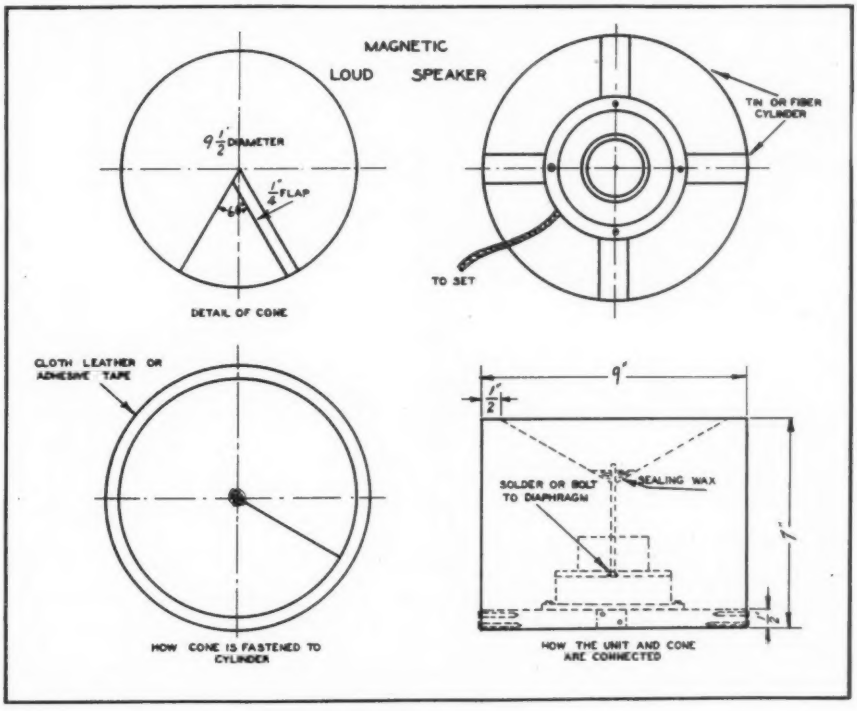
Clarence H. Bellmann, Portage Park School, Chicago, Illinois

The old-fashioned horn speaker is rapidly vanishing and is being displaced by the magnetic and dynamic types.

For those who wish to save some money, this speaker can be made from the unit used in the horn. If it is adjustable so much the better, as a better tone can be produced.

The cone is made of heavy drawing paper, or better yet, of cone paper. This can be bought at any radio store. Draw a circle 9½ in. in diameter, and from the center draw lines at 60 deg. allowing a ¼-in. flap for gluing. Cut on lines and glue. Next make the crossbar. This consists of two sticks 9 by ½ by ½ in. jointed with a middle lap joint.

Take the loud-speaker unit and examine the diaphragm. If a piece of wire 18 gauge or thicker cannot be soldered to it in



any way, take the diaphragm out and put a small bolt through it in the middle, tightening it with a nut. To this bolt a wire can be soldered. Put the diaphragm back carefully and fasten the unit to the crossbar. If holes cannot be drilled through the unit to fasten it, long screws can be put close to it on the outside of it to hold it tight.

Procure a piece of tin about 30 in. long and 7 in. wide. Tack one end on one crosspiece and bend around the crossbar to form the cylinder. Tack in place. At the open end of the cylinder, the two ends may be fastened together, by cutting two short slots about ¼ in. apart and bending the pieces of tin together. You now have the crossbars, unit with wire and the cylinder assembled.

To fasten the cone to the cylinder, glue cloth around the outside edge of cone or use strips of adhesive tape. The commercial types have leather or cloth. Make a small hole in the cone for the wire to pass through, and put cone in place, gluing the cloth tightly all around. The speaker is now ready to test.

To get the best results the speaker must be mounted in a cabinet with the back open, and the front must have a baffle board, that is, a board ⅛ in. or ½ in. thick with a hole larger than the cone, but smaller than the cylinder. The cone must be free, and the board acts as a sounding board in a piano or any other instrument of its kind. The sides of the cylinder are cut out between the crossbars in a V shape to alleviate any vibration in that part of the speaker. The baffle-board hole may be plain or scroll with cloth over it. Mount the cylinder in the cabinet so that it is fastened in the back, and free in the front.

The cost of this project is practically nothing if one has an old speaker unit, and the results are truly wonderful.

TELEPHONE TABLE AND CHAIR

Lyle Garnett and Ray J. Matasek, Milwaukee Vocational School, Milwaukee, Wis.

The telephone table and chair presented herewith have proved to be two very popular projects with the boys. The construction is very simple and with a bit of care on the part of the boys, they are able to turn out telephone sets which they are proud to exhibit.

The sets may be made of almost any type of lumber from bass and poplar to the more expensive mahogany and walnut. We have found through experience that either gum or oak work very well in these two pieces. The gumwood takes a very fine lacquer or enamel finish as well as the walnut and mahogany finishes.

In constructing the table, (Fig. 1) the bevels on each end of the legs should be cut before the band sawing is done on the front of the legs. The shoes at the bottom of the legs may be fastened in several ways, either by the use of a dowel joint, a mortise-and-tenon joint or with flat-head screws.

The stretcher and legs are next assembled and then the bottom of the box or shelf is put on the top of the legs. Both these parts are screwed together with flat-headed screws. The method of using the screws on the stretcher is sometimes known as the blind screw. A hole ⅜ in. or ½ in. in diameter is bored to a depth of 3/16 in. from the outside of the leg. The pilot hole the size of the screw shank is then drilled the rest of the way through the leg. The leg and stretcher are then assembled the same as any other two pieces would be screwed together. A plug is cut with a plug cutter of the proper size, and this plug is glued into the hole over the screw head. Be

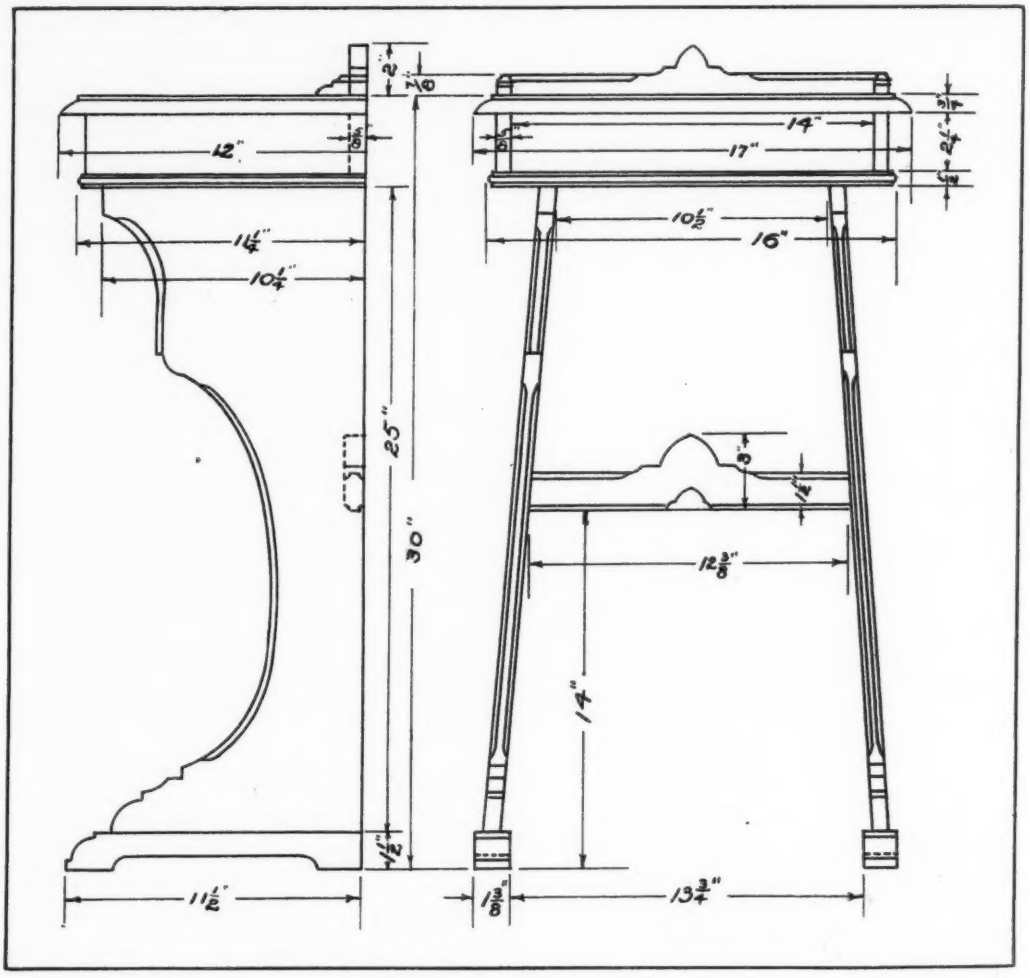


FIG. 2. TELEPHONE STAND

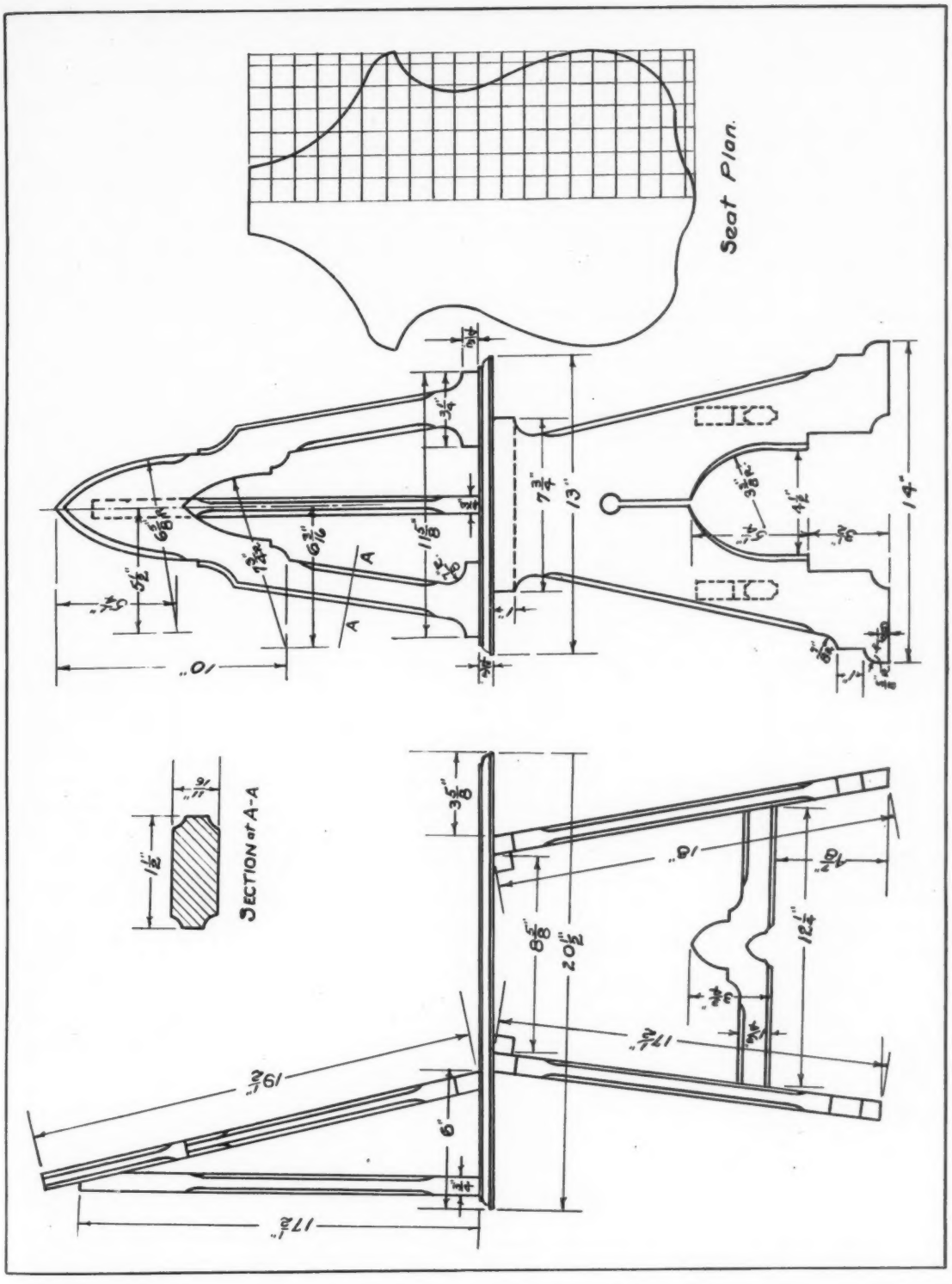


FIG. 1. CHAIR DESIGNED BY LYLE GARNETT AND RAY F. MATASEK, MILWAUKEE, WIS.

sure that the grain on the plug runs in the same direction as that of the leg.

The rails of the box and the top are held in place with small steel fasteners resembling the figure 8. The legs and box are then screwed together with flat-head screws.

In making the chair, (Fig. 1) the bevels on the various pieces are all cut before the pieces are band sawed and shaped. The back, seat and brace are assembled in one section, while the legs, stretchers and leg blocks are assembled in another. The two sections are then screwed together.

The brace is fastened to the back with two round-head screws. The other parts are fastened with flat-head screws. The leg blocks at the top are glued and screwed to the legs. The stretchers on the chairs are fastened with two screws on each end of each stretcher using the blind-screw method.

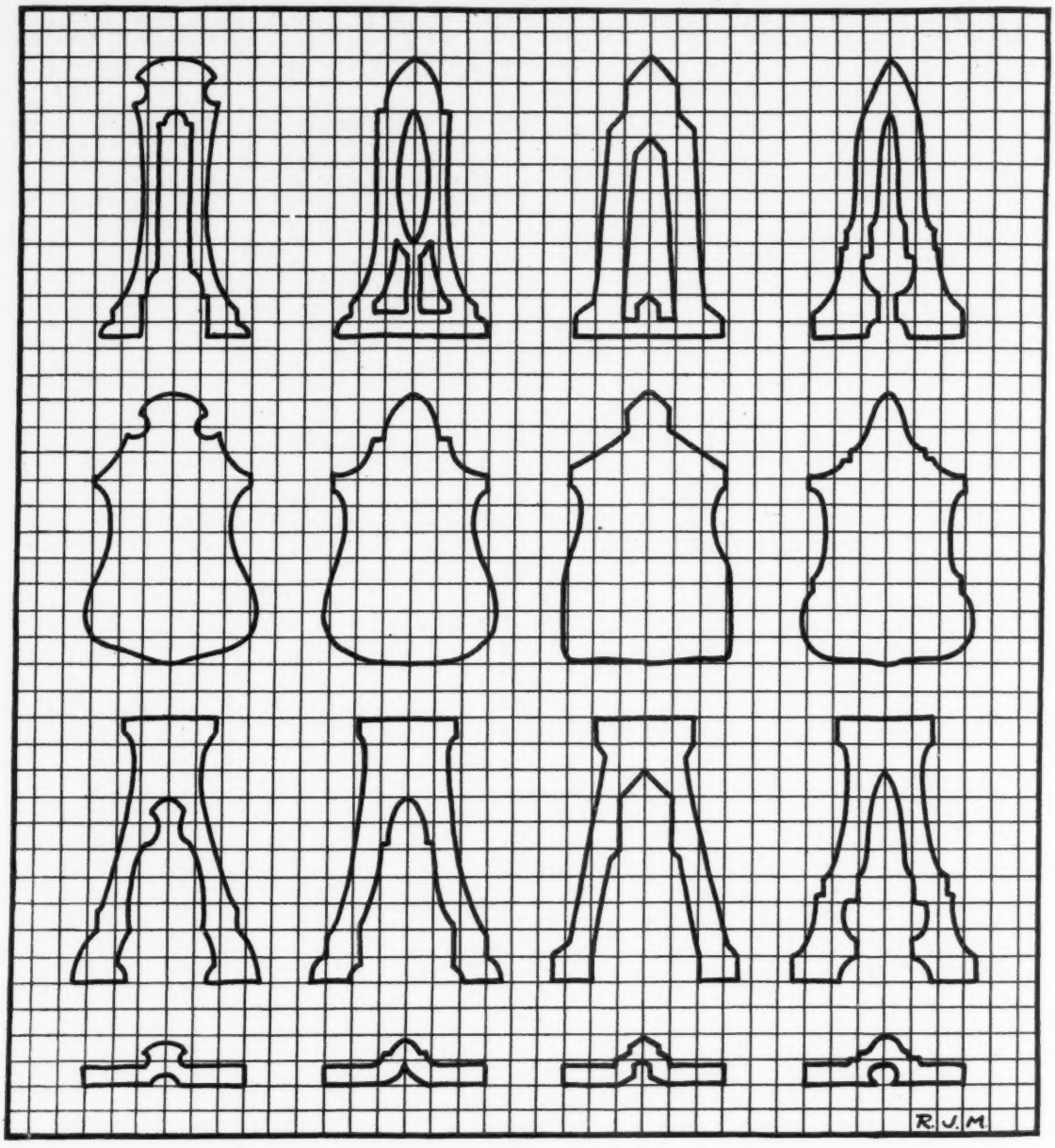


FIG. 3. SUGGESTED DESIGNS FOR BACKS, SEATS, AND STRETCHERS

The chairs may be made separately and can be used in many places either as an odd chair in the reception hall, a desk chair, radio chair or they may be made in groups of four with a drop-leaf table of suitable design and used as a breakfast set.

Figure 3 shows some alternate designs which may be used for the chair. No dimensions are given in the drawing because the over-all dimensions are the same as in the previous drawing. Each square shown represents a two-inch square and can be laid out that way when making a larger pattern.

It is suggested that the design be drawn on a large sheet of paper and then cut out with a scissors. In this way any minor irregularities could be straightened out before applying the design to the wood.

In designing telephone stands to go with the chairs some part of the design of the chair should be repeated in the stand.

Bright-colored lacquers with small amounts of contrasting colors work out very well and give the average room just that touch of color which raises it out of the commonplace.

WROUGHT-IRON END TABLE

Roland M. Torgerson, Winona State Teachers College, Winona, Minn.

There is a tendency at the present time for junior-high-school shops that have been heretofore dealing primarily with woodwork and drawing to include in their programs some other lines of work. Many of the better schools are favoring some courses dealing with metal.

There are many things about wrought-iron work which justify it as worthy of a place in the program. The boy gets a little taste of the metal trades; he handles new materials and new tools; he learns new processes or operations, such as riveting, bending, twisting and drilling iron. There is much valuable related material connected with this work, such as the sizes of rivets, sizes and uses of drills, manufacture of wrought iron, methods of fastening, etc. The art phase of this work is extremely interesting. In working with wrought iron, the

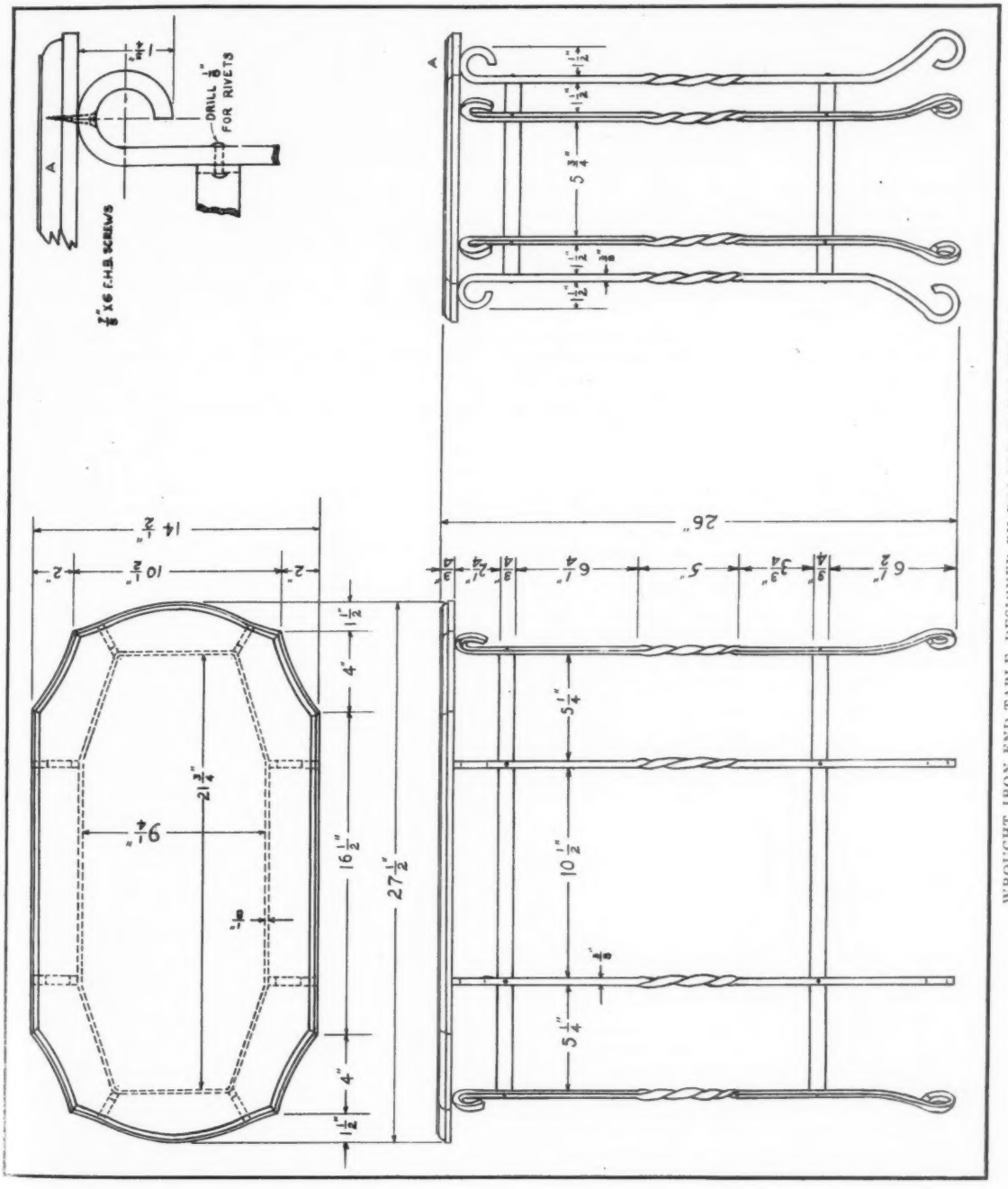
teacher is given an opportunity to plan work with the students and to study many phases of the metal trades.

Very little additional equipment is needed and the cost of materials is not more than for woodwork. Much wrought-iron work can be done cold where a forge is not available.

At the present time this work has found a coveted place in the home and many articles both useful and artistic can be easily fashioned from wrought iron. The end table seems to be an increasingly popular item. The one described in this article is not difficult to make and seems to be a good project for wrought-iron treatment. An outline for its construction follows:

Operations

1. Measure and cut the legs to the proper length. Use a hack saw for cutting.
2. Shape the top and the bottom of each leg. This can be done cold on an anvil vise and over an iron rod of the right diameter.
3. Make one full twist on each leg. The twists can be made by putting one end in the vise where the twist should start and using a monkey wrench on the other end of the twist.
4. Lay out, center-punch, and drill the holes in the legs.
5. Cut two pieces of band iron to the correct length for the rails.
6. Shape the rails, twist, and drill the holes.
7. Rivet the pieces together, making a lap joint on one leg. Use round-head rivets ⅛ in. longer than the distance through the pieces. The heads should be on the outside. To rivet, use light blows with a ball-peen hammer.
8. Select the wood for the top. Softwood is commonly used.



WROUGHT IRON END TABLE, DESIGNED BY ROLAND M. TORGERSON

9. Plane, shape, and sand the top.
10. Fasten the top to the legs. Use ⅞ by 6-in f.h.b. screws and countersink.
11. Finish
    a) Use one coat of lacquer primer on wood and iron. Apply with a one-inch lacquer brush and allow to dry for one hour.
    b) Use one coat of lacquer on wood and iron, flowing it on rapidly and smoothly (care must be taken to avoid brushing it out to thin). Most lacquers dry within an hour. Any color combination may be worked out. The color used on this table was jade green.
    c) Decorate the twisted parts and edge of top in antique gold, using antique gold bronzing powder mixed with a bronzing liquid. If preferred, a lighter shade of gold may be used. This will dry in about one hour. (Care should be taken not to have the solution too thin else it will run, will not cover well, and will not leave a satin-like finish.)
    d) The top of the table was decorated with an art medallion. If preferred, a decalcomania decoration may be substituted.

AN ELECTRIC LANTERN

E. A. Rerucha, Wakefield, Michigan

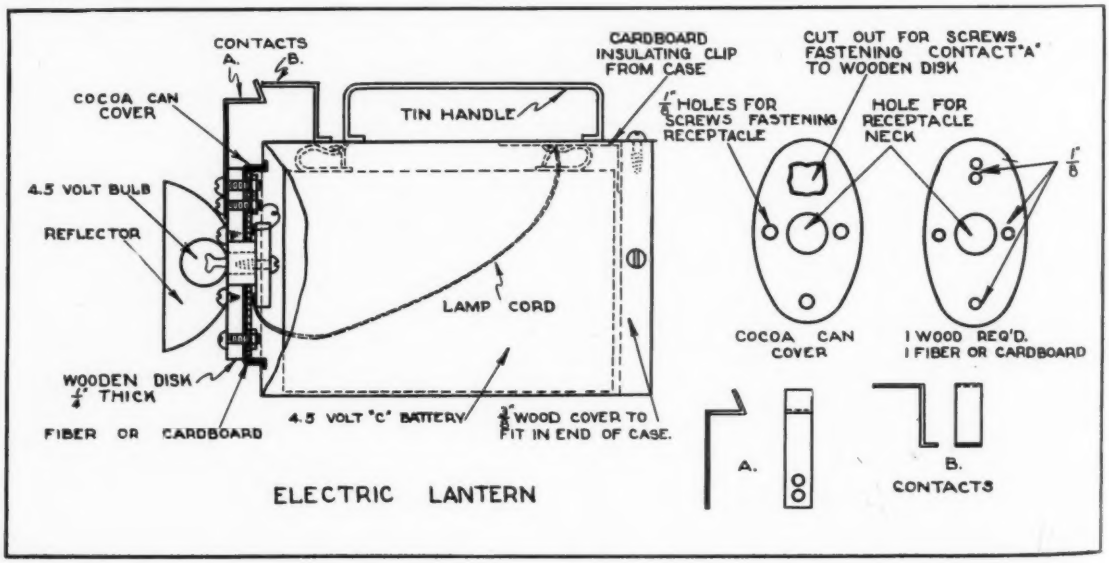
A serviceable electric lantern can be made from an ordinary 2 by 3 by 5-in. rectangular cocoa can. The essential parts required are as follows: A small aluminum funnel 2½ in. in diameter, a 4½-volt radio "C" battery, miniature lamp receptacle, and a 4½-volt mazda lamp.

First, remove the bottom of the can which can be done with a pair of pliers, as it is merely crimped in place, and prepare in its stead a wood piece to fit snugly inside the can. This is fastened with r.h. wood screws as shown in the drawing, and serves as the cover for opening the case when a battery is changed. Remove the oval lid and trace the raised oval on a piece of ¼-in. panel board and cut out. Bore a hole in the center to admit the neck of the miniature lamp receptacle. Also trace and cut another oval from cardboard or thin fiber. Drill ⅛-in. holes in the wood and fiber as indicated in the illustration. Remove the binding screws from the receptacle and in their place, solder pieces of lamp cord, one about 2 in. long and the other about 8 in. long. Make the contact pieces A and B. Cut out a portion about ½ in. square from the oval lid as shown and also drill the ⅛-in. hole indicated. The ⅛-in. holes in the fiber, wood piece, and tin lid should match so that a screw can be put through to fasten them together. Now assemble the lid, fiber, and wood piece and receptacle as indicated in the drawing. Fasten the receptacle with No. 4 r.h. screws ⅝ in. long. Be careful that the pieces of lamp cord do not touch any part of the can so as to ground. The long wire goes to the terminal of the battery which is insulated from the can by means of a piece of cardboard as shown in the assembly view. Now fasten the contact A by means of two No. 4 brass machine screws ⅝ in. long and solder the short piece of the lamp cord from the receptacle to one of the screw heads. These screws and contact should not touch any part of the tin can and it is for this purpose that the ½-in. square has been cut in the lid. Now place the lid in place from the rear of the can. Solder contact spring B in place so that when pressed down a contact is made with A. If a permanent contact is desired contact B is pressed down until it engages under contact A. This is clearly shown in the illustration.

The reflector is made from a small aluminum funnel. The neck of the funnel is cut off and the hole enlarged so that it fits over the receptacle neck. The back of the funnel is slightly flattened so that it can be fastened snugly to the wooden disk with the No. 4 ¼-in. r.h. wood screws.

The inside of the reflector is given a coat of white lacquer or enamel and the entire case a coat of black lacquer or enamel.

This lantern makes a good project for the junior-high-school boy.



A PROOF ENVELOPE

By R. Randolph Karch, Head of the Department of Printing, Steubenville, Ohio

Printers in both commercial and school shops often have difficulty in reading marks on proofs returned to the shop by persons who are not familiar with the trade.

Very often proofs are lost, or are returned unmarked and unsigned, thus puzzling the printer as to whether the proofs reached the person to whom they were sent.

Badly marked proofs are confusing to the boys in the school shop, and the influence often causes the class to become careless in their own proofreading.

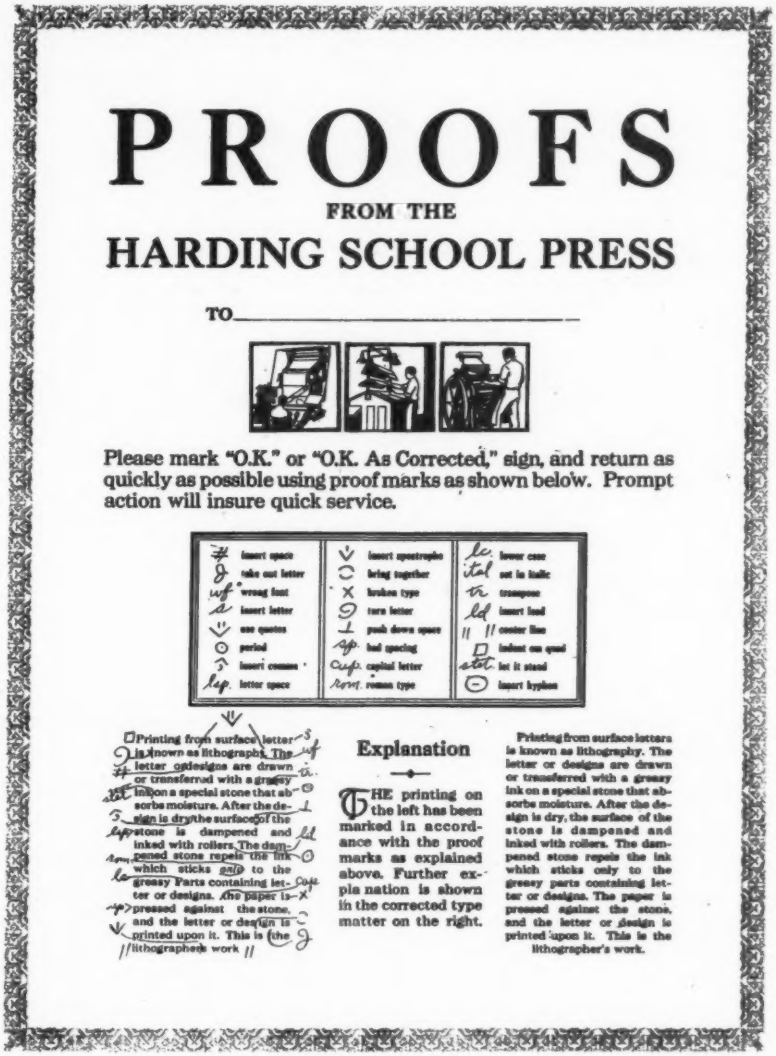
These difficulties were done away with at the Harding Junior High School Press by a unique plan of "educating" those who were not familiar with proofreading. The plan follows:

All proofs, either job or bookwork, are sent out in a 9 by 12 heavy clasp manila envelope. This is addressed to the person to whom the proof is sent, and prevents the copy and proof being separated and perhaps one or the other lost. This also prevents the proof from being rolled up and "pigeonholed" until a later date for reading.

Directly under the space for the address, three ornaments in color represent the departments of the shop—linotype, hand and make-up, and presswork. Below this is a short paragraph in 14-point, advising "Please mark O.K. or O.K. as Corrected, sign, and return as quickly as possible, *using the proof marks as shown below.* Prompt action will insure quick service." As schoolmen are usually in a hurry for their printing, this last sentence is in good order.

In a box are shown the standard proofreaders' marks and their meaning. Directly below this a sample of proof marking is shown, and to the right the corrected form, explaining in detail the procedure of marking the proof.

Thus, when the layman desires a proof of his work, he is given an idea of how to intelligently mark it so that printers can understand him, save possible errors through misunderstanding of marks, and save the usual voluminous explanations in the margin of the proof and over the telephone.

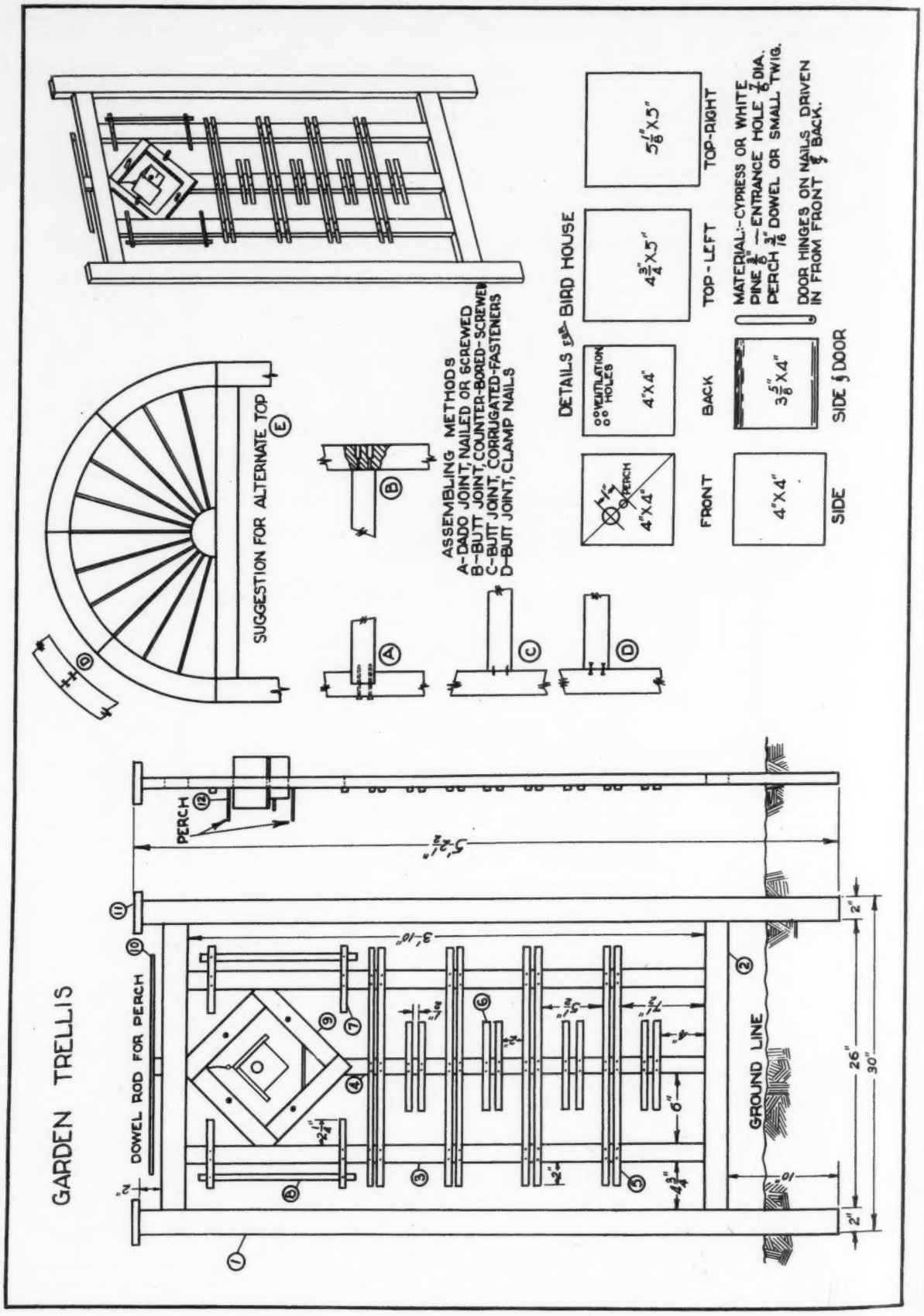

PROOFS
FROM THE
HARDING SCHOOL PRESS
TO_____
Please mark "O.K." or "O.K. As Corrected," sign, and return as quickly as possible using proof marks as shown below. Prompt action will insure quick service.
Explanation
THE printing on the left has been marked in accordance with the proof marks as explained above. Further explanation is shown in the corrected type matter on the right.
Printing from surface letters is known as lithography. The letter or designs are drawn or transferred with a greasy ink on a special stone that absorbs moisture. After the design is dry, the surface of the stone is dampened and inked with rollers. The dampened stone repels the ink which sticks only to the greasy parts containing letter or designs. The paper is pressed against the stone, and the letter or design is printed upon it. This is the lithographer's work.

A SPRING SHOP PROBLEM

E. W. Manzer, Bronxville, N. Y.

In spring, practically every handy man is seen making something new for his home or repainting the old things so that his surroundings will look as well as those of his neighbors. Pride in doing things that will make ones community better is a trait that can be developed in the junior-high-school boy. In many shops the boys are taught to appreciate things that are beautiful, to do things for others, and to learn about citizenship. Some of these aims are accomplished when a project like the garden trellis is made for the home.

By placing pictures of garden furniture on the "suggestion board" an interest can be centered in projects of this kind. Then by proper guidance the instructor can get the students


GARDEN TRELLIS
DOWEL ROD FOR PERCH
PERCH
GROUND LINE
SUGGESTION FOR ALTERNATE TOP
ASSEMBLING METHODS
A-DADO JOINT, NAILED OR SCREWED
B-BUTT JOINT, COUNTER-BORED-SCREWED
C-BUTT JOINT, CORRUGATED-FASTENERS
D-BUTT JOINT, CLAMP NAILS
DETAILS of BIRD HOUSE
VENTILATION HOLES
PERCH
4"X4"
FRONT
BACK
SIDE
4"X4"
4"X4"
TOP-LEFT
4¾"X5"
TOP-RIGHT
5⅛"X5"
SIDE & DOOR
3⅝"X4"
MATERIAL:-CYPRESS OR WHITE PINE ⅞"
ENTRANCE HOLE 1⅛ DIA.
PERCH ⅜" DOWEL OR SMALL TWIG.
DOOR HINGES ON NAILS DRIVEN IN FROM FRONT & BACK.

started on their spring-improvements drive. Perhaps the interest may come from the parents. Work of this type will advertise the school shop more than the simple things that are made for the boy's own enjoyment. Of course, there should be a time when the boy can make just what he is interested in, but sometime during his course he should make something for dad and mother.

The trellis shown in the accompanying drawing is one that the average junior-high-school lad can make without much trouble. The drawing shows several ways for putting the trellis together, and also shows how the pupil can design part of it himself. The more advanced boy can design a different top or make some change in the general appearance of the trellis. The following bill of material has been worked out so that the boy will have some tangible thing to follow when the drawing has been placed on the "suggestion board."

Bill of Material

2 pc.	¾ x 2 x 62	Part No. 1
2 pc.	¾ x 2 x 26	2
2 pc.	¾ x 1½ x 46	3
1 pc.	¾ x 1½ x 32	4
8 pc.	⅜ x ½ x 20½	5
8 pc.	⅜ x ½ x 9½	6
4 pc.	⅜ x ½ x 6	7
2 pc.	⅜ x ½ x 14	8
4 pc.	¾ x 1½ x 9½	9
2 pc.	½ x 3 x 3	10
1 pc.	3/16 x 18 Dowel	11
4 pc.	3/16 x 6 Dowel	12

Note:

All ¾-in. material may be changed to ⅞-in. if your shop does not have a surfacer or if the material cannot be secured surfaced on both sides.

If desirable, dowel rods may be used for parts 5 and 6. This provides more perch room for the birds.

Dimensions given in the bill of material, are for butt-joint construction.

AN EDUCATIONAL GUIDANCE CARD FOR SECONDARY SCHOOLS

With the opening of the second semester, a new educational-guidance record card has been introduced in the high school at Erie, Pa. The card is patterned after a similar one which had been tried with much success in Johnstown. There appears to be no question about motive or direction for the course to be undertaken. From the ninth year on, the student's course is well laid out and the adviser is made fully acquainted with the course of study pursued.

The card provides space on the reverse side for the parent's signature and for remarks. In case a parent becomes dissatisfied with the course taken and attempts to place the blame on the school, the card shows that his consent was obtained to the course before the pupil began work.

Guidance

GUIDANCE RECORD CARD
Secondary Schools, Erie, Pa.

Name .....Date of Birth..... Residence .....
What College or Higher Institution have you planned to attend? .....How soon?.....
Have you studied the catalog of this school?.....What course are you taking in High School?.....
In what way will you defray expenses incident on attending school? .....
Is there anything we can do to aid you?.....
What vocation are you preparing to take up?.....
What study have you made of the possibilities and requirements of this vocation?.....
Why have you selected this vocation?.....

ENTRANCE REQUIREMENTS

Is entrance by Certificate, Regular Examination, Psychological or Comprehensive Examination or Appointment? (Underline).

Subjects Required	*Units*	*Subjects Elective*	*Units*
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....

Total units required?.....

What subjects are you preparing to take to fulfill these requirements?

8th Year	*9th Year*	*10th Year*	*11th Year*	*12th Year*
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....

ADVISER'S NOTATION

Does this program satisfactorily fulfill requirements?.....What changes? .....
..... Adviser..... (Over)

FRONT

To Parents

One of the most important functions of our secondary schools is to prepare successfully pupils for institutions of higher learning. In order to insure this careful preparation, we have asked our teachers to advise with the pupils concerned to help them make satisfactory selections of their secondary-school subjects. It must be pointed out that many pupils are not sure of either what college they wish to attend or what vocation they wish to take up in life, but this guidance is only an attempt on our part to get our pupils to do some thinking and planning in regard to their future as an individual and as a citizen.

The principal-teachers and course-advisers will welcome interviews with any parents who wish to talk over in regard to the welfare of any pupils.

We are sure that with proper cooperation on the part of the pupil, parent, and school authorities, that our pupils will be successfully prepared in our schools for any institution of higher education they may wish to attend.

Parent's Signature.....

Follow-Up Data—Post High School

Entered ..... Date .....
Report of First Year's Work.....Report of Second Year's Work.....
Graduated .....
Success in Higher Institution.....
Letters and Records from Higher Schools should be attached.
What position secured?.....
In case pupil did not go to college indicate here just what work he has taken up. .....

BACK

PROPERTIES OF COMMON WOODS

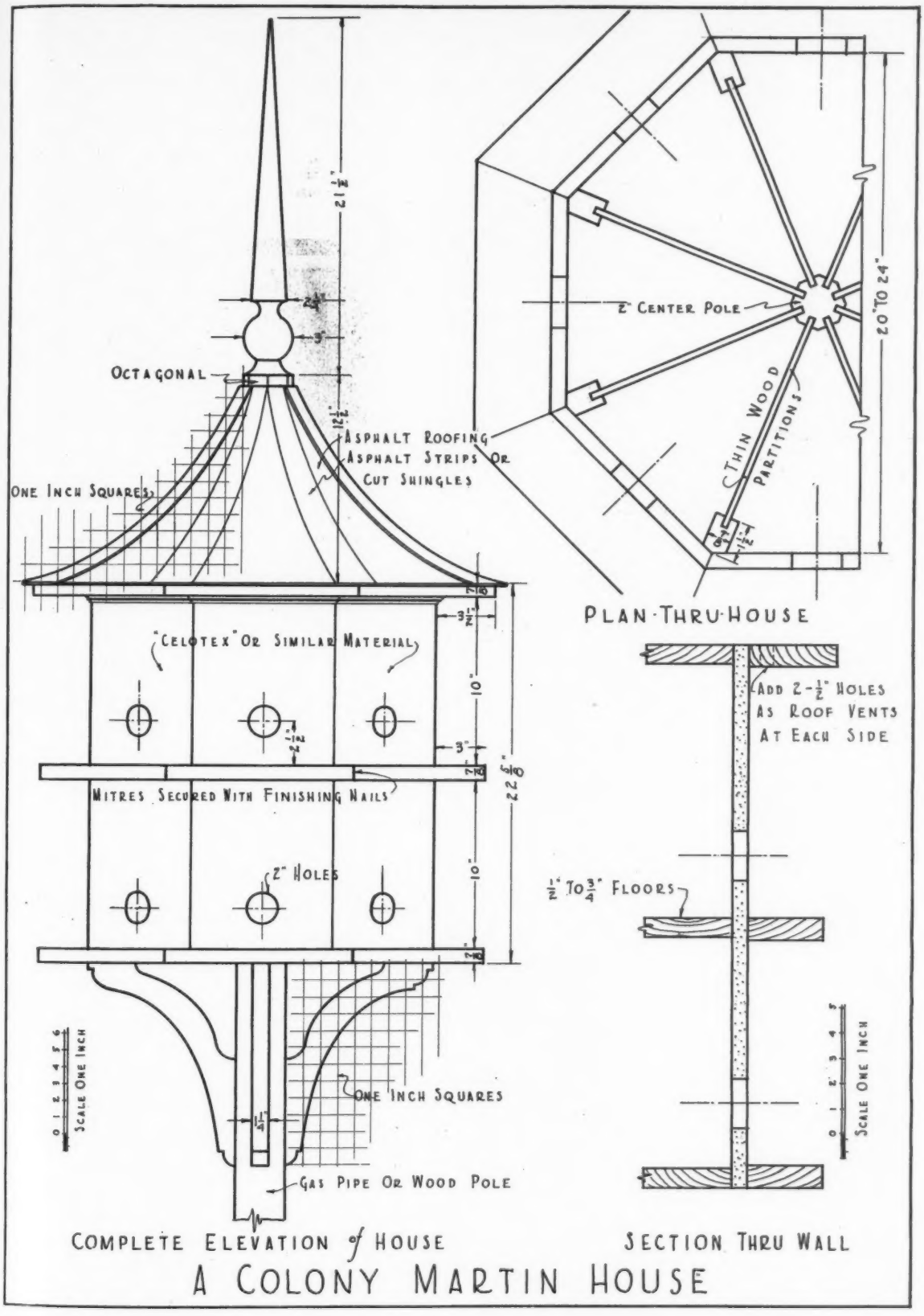
H. H. Robinson, Augusta, Kans.

KIND OF WOOD	COLOR		WEIGHT			STRENGTH		ELASTICITY		HARDNESS
	Heartwood	Sapwood	Lbs. Per Cu. Ft.	Comparative	Relative	Comparative	Relative	Comparative	Relative	Comparative
Ash	reddish brown	whitish	39	heavy	6	strong	8	elastic	10	hard
Birch	reddish brown	white	40	heavy	5	very strong	1	very elastic	1	medium hard
Cypress	reddish brown	yellowish brown	29	light	13	medium	13	elastic	9	soft
Fir	red to yellow	yellowish	32	medium light	11	strong	7	very elastic	5	medium soft
Gum, Red	red-brown	grayish white	37	medium light	9	medium	10	medium elastic	14	medium soft
Hickory	reddish brown	whitish	51	very heavy	1	very strong	2	very elastic	4	very hard
Mahogany	red-brown	yellow	45	heavy	3	strong	5	elastic	7	very hard
Maple, Hard	brown	light cream	43	heavy	4	very strong	3	very elastic	2	very hard
Oak, White	brown	whitish	46	very heavy	2	strong	6	medium	15	hard
Pine, Yellow	red and yellow	yellowish white	38	heavy	8	strong	4	very elastic	3	medium
Pine, Western White	brown or red	nearly white	24	light	16	not strong	16	medium	11	very soft
Poplar	greenish or yellow brown	cream white	26	light	14	medium	14	medium	12	soft
Red Cedar	dull red	yellowish white	30	light	12	medium	12	brittle	17	medium
Redwood	red to brown	whitish	26	light	15	weak	17	brittle	16	soft
Sycamore	reddish brown	light brown	35	medium	10	medium strong	15	medium	13	medium hard
Walnut	chocolate brown	cream	38	heavy	7	strong	9	elastic	6	hard
Red Cedar, Western	dull brown or red	nearly white	23	light	17	medium	11	elastic	8	soft

KIND OF WOOD	HARDNESS	SHRINKAGE In Per Cent	WARPAGE	DURABILITY	WORKABILITY	GRAIN	MEDULLARY RAYS	USES
	Relative							
Ash	5	5	little	none	hard (tough)	very porous, coarse, straight	obscure	implements, oars, bats, baskets
Birch	8	6	warps	none	hard	porous, close, straight	numerous obscure	furniture, spools, dowels, arrows
Cypress	14	3	warps	most durable	easy	nonporous, fine, straight	obscure	shingles, posts, boats, inside trim
Fir	12	3-4	warps	moderate	hard (slivers)	nonporous, close, straight	numerous obscure	heavy construction, masts, ties, boards
Gum, Red	10	6	very bad	not durable	easy (warps)	porous, close, straight	numerous obscure	furniture, veneer, paving, staves
Hickory	2	10	bad	not very durable	hard (tough)	porous, close, straight	numerous thin	handles, wheels, implements, bows
Mahogany,	1	5	very little	durable	well	porous, close, crooked	fine obscure	furniture, interior finish, veneer
Maple, Hard	3	5	very bad	not durable	hard (hard)	porous, close, wavy	fine conspicuous	furniture, cars, handles, floors
Oak, White	4	5-6	warps	durable	hard (tough)	very porous, coarse, crooked	thick conspicuous	ships, vehicles, furniture, floors
Pine, Yellow	11	4	moderate	moderate	hard	nonporous, coarse, straight	numerous visible	heavy construction, ties, ships, bridges
Pine, Western White	17	3	moderate	moderate	easy	nonporous, straight	numerous visible	building, interior & exterior finish
Poplar	13	5	little	durable	easy	porous, close, straight	numerous plain	furniture, car bodies, veneer cores
Red Cedar	9	3	little	very durable	easy	nonporous, close, straight	numerous obscure	pencils, posts, chests, pails
Redwood	15	3	little	very durable	easy	nonporous, straight	numerous obscure	shingles, timbers, posts, siding, ties
Sycamore	7	5	very little	very durable	hard cross grain	porous, close, cross	large conspicuous	furniture, boxes, butcher blocks
Walnut	6	5	little	very durable	well	porous, straight	numerous obscure	gun stocks, veneer, cabinet work
Red Cedar, Western	16	3	little	very durable	easy (splits	nonporous, coarse, straight	numerous obscure	shingles, posts, siding, cabinet work

The following authorities were consulted in compiling the foregoing table: Handbook on the Trees of Northern States and Canada, by Hough; Bureau of Standards, Circular No. 70, Materials of the Household; Wood and Forest, Noyes.

The following definitions are to be noted:
Elasticity is the ability of wood to regain its former shape after having been forced out of shape by bending, twisting, etc.
Hardness is the ability of wood to resist indentation and wear.
Durability is the ability of wood to withstand decay when exposed to moisture.



A COLONY MARTIN HOUSE

A COLONY MARTIN HOUSE

Horace E. Boggy, Arsenal Technical School, Indianapolis, Ind.

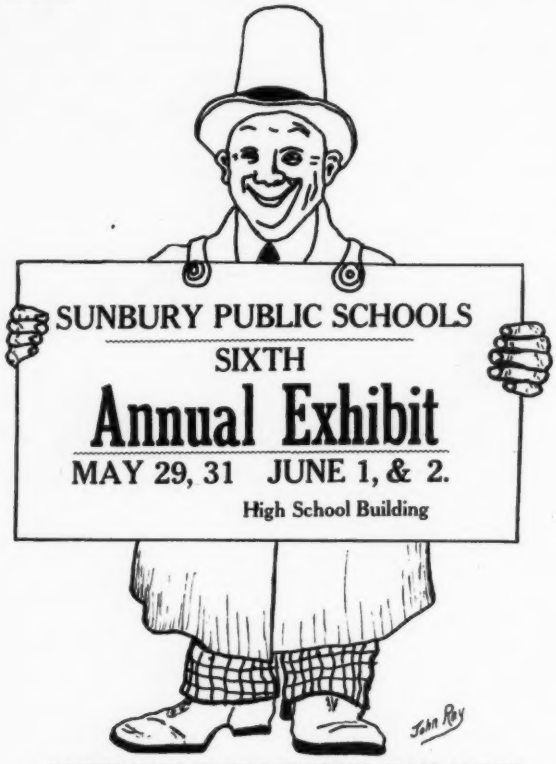
A bird which is attractive in appearance, unusual in habits, harmless, and certainly beneficial to mankind, is the martin. If space were provided here, a search into the life, habits, and traditions of this bird family would reveal many facts which could not fail to interest both young and old. It is a unique bird to have about the home.

Since they live only in colonies, it is necessary to provide a house which is suitable for many families. Usually we find an ordinary gabled house built much as a miniature barn with the customary entrance holes and partitions. It is the author's opinion that as much care should be exercised in the design of all things in the yard and garden as is used in the design of the home itself.

The martin house illustrated in this article is not entirely uncommon, but it is a very practical one, and should make an attractive problem for the woodworking student. The illustration is meant to be complete enough for the execution of the work required in its construction. The size can be varied by adding to its dimensions rather than subtracting from them. An effort should be made to use light materials where possible in order to be assured of no top-heaviness.

No special provisions have been made for cleaning the nests, as the old nesting material may be pulled through the entrance hole with a wire hook. For purposes of ventilation, one or two small holes may be bored through the front wall of each compartment. These holes should be located about ½ to ¾ in. from the top of the compartment.

The small illustration shows one of these houses bolted to a 24 ft., 2½-in. wrought-iron pipe set into the ground 4 ft., with a 6-in. concrete fill at both top and bottom of the hole. This makes an ideal pole support which is both strong and durable.



A POSTER MADE BY THE PRINTING CLASS AT THE SUNBURY HIGH SCHOOL, SUNBURY, PA. WAYNE E. STEINER, SUPERVISOR

SHEET-METAL URNS

Harry E. Anderson, Instructor In Sheet-Metal Work, Academy High School, Erie, Pennsylvania

The problem of teaching cornice layouts and construction, without working on an actual cornice construction, might be solved by making one of the urns shown in the accompanying illustrations. This project eliminates a pure exercise, permits the use of full-size materials, and results in an interesting and useful product.

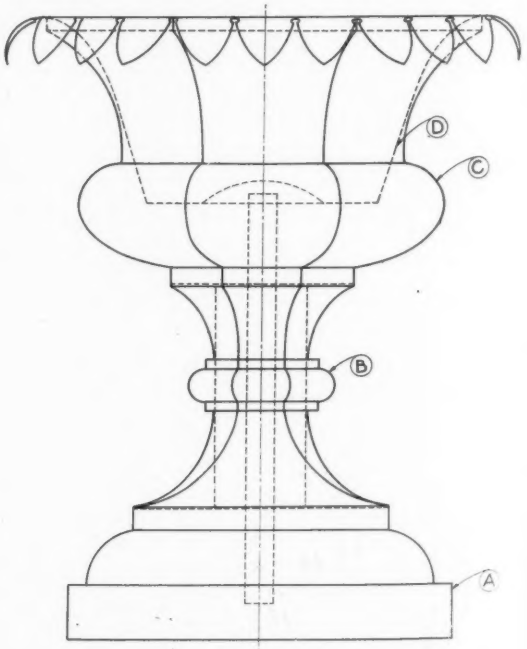
The layout of these urns makes it possible for the student in the drafting class to use his ingenuity in artistic design. The layouts involve parallel-line development and should offer no difficulty to a sheet-metal-trade class.

Constructing the urns involves layout, cutting, notching, forming, bending, fitting, soldering, and filing. The machines and tools used include cornice brake, forms, square stakes, square, miter, soldering iron, file, mallet, and hammer.

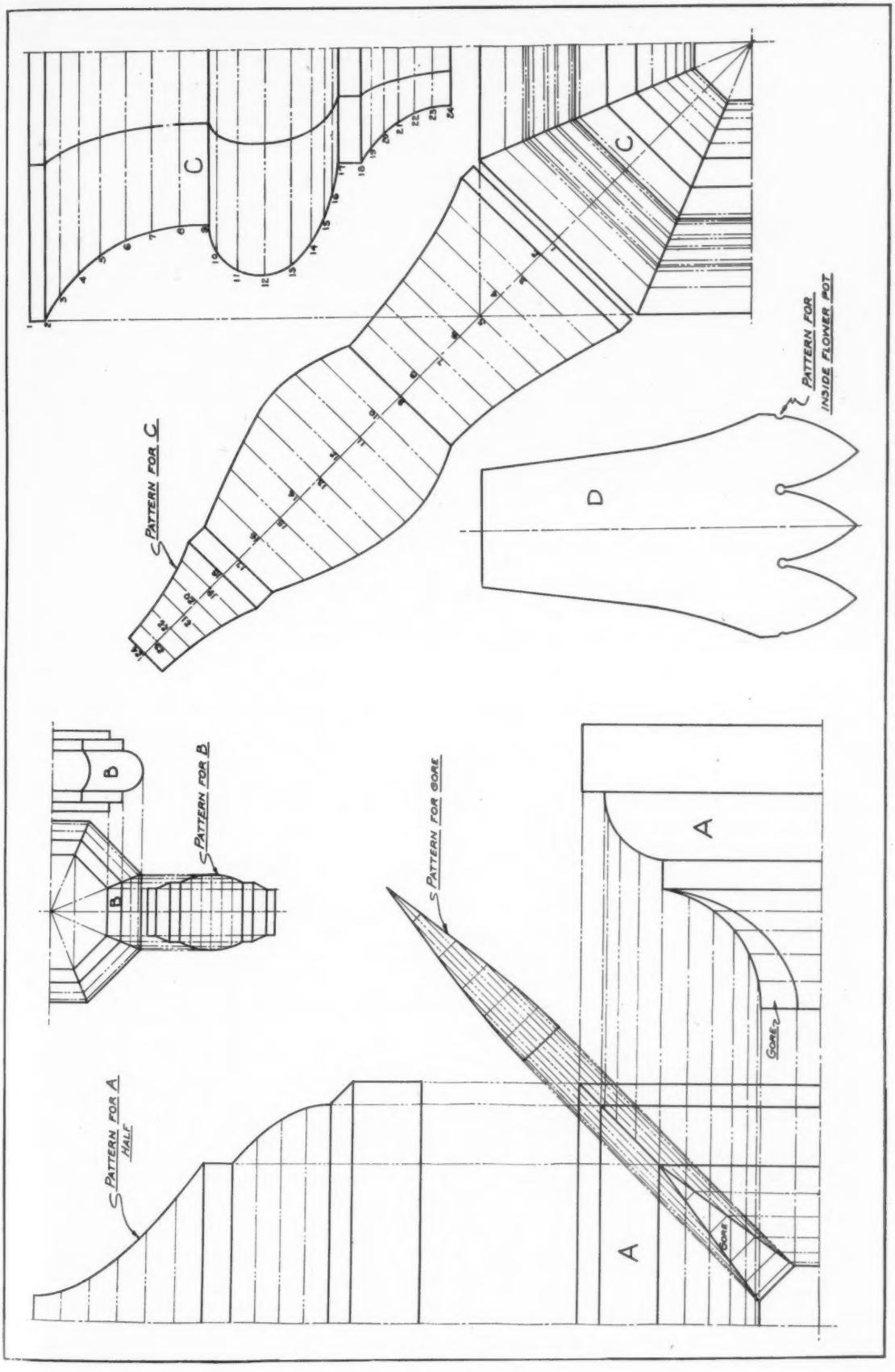
The materials used in the construction are 24-gauge galvanized iron for the bodies and 16-ounce cold-rolled copper for the lining at the top of the urn. This lining keeps the moist earth from the iron and prevents rust. The base may be made of concrete with a 3-in. diameter hole in the center, into which the drain pipe from the urn projects.

In finishing these projects, apply five coats of stone-color paint to the galvanized iron. While the fifth coat is wet, fine lake sand may be thrown on the paint, to give a more realistic appearance of stone.

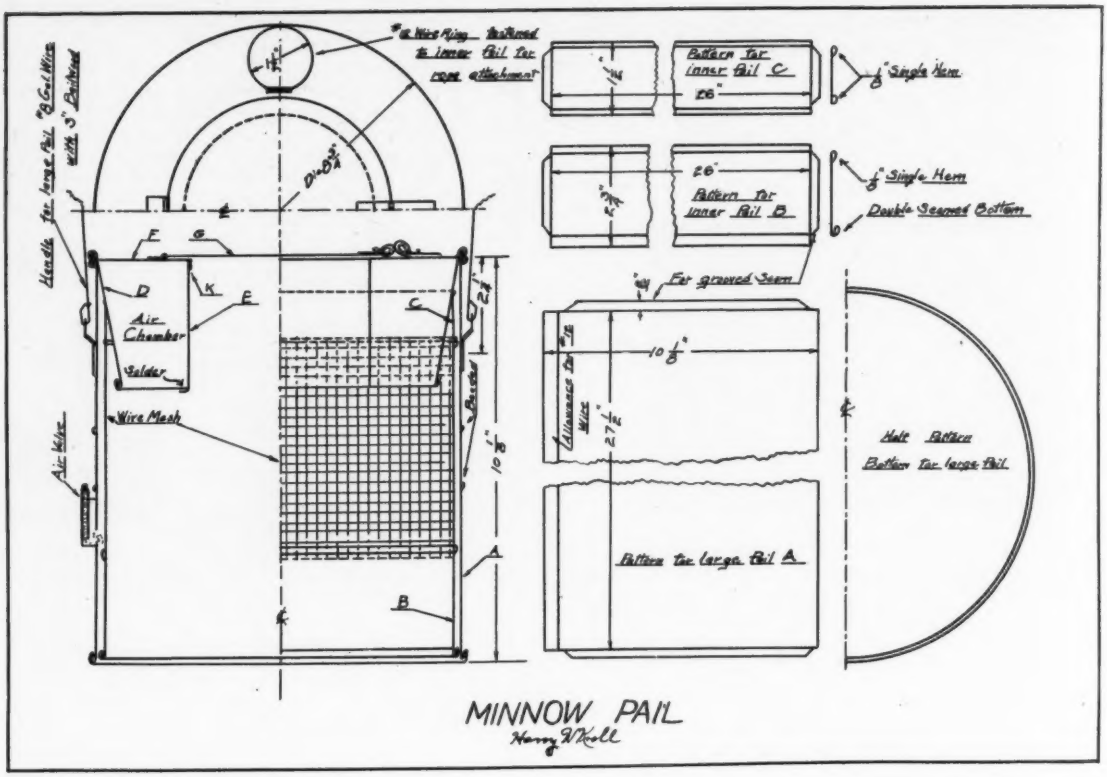
These urns may be used as a decoration for a school lawn, a private lawn, a public park, or a cemetery lot.

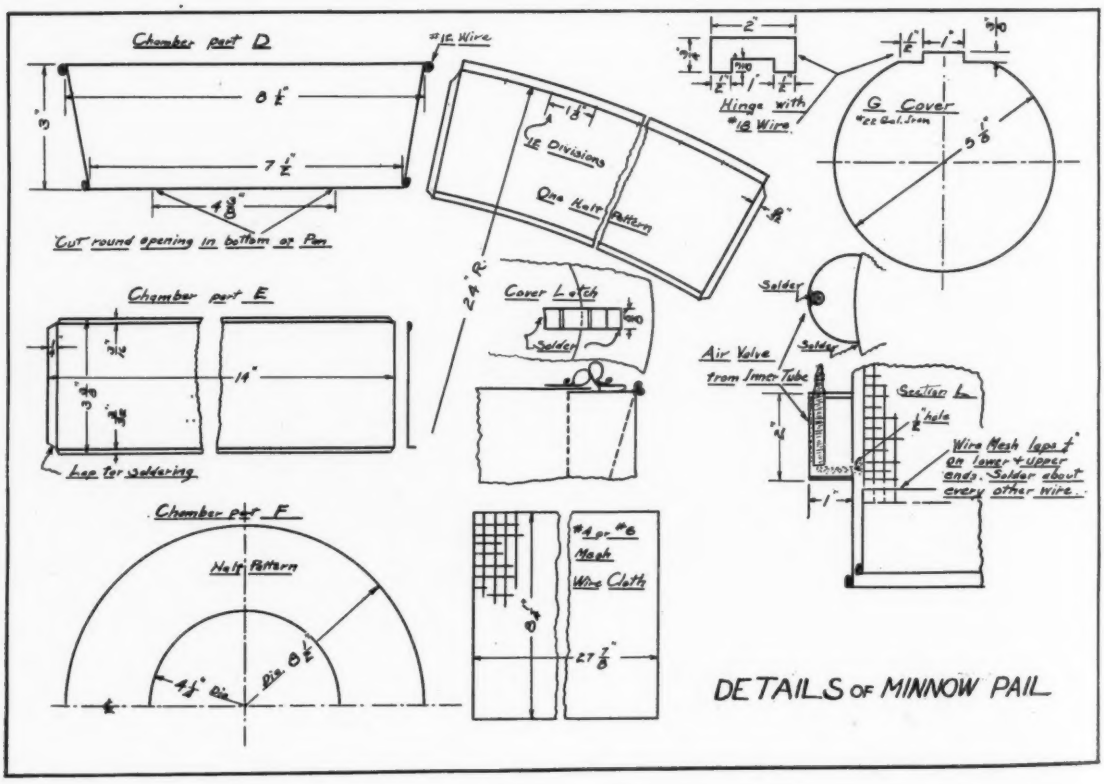


ASSEMBLY OF URN



LAYOUT FOR SHEET-METAL URN


Handle for large Pail "20 Gal. Wire with 3" Bail
Air Chamber
Solder
Wire Mesh
Air Valve
Pattern for inner Pail C
Pattern for inner Pail B
Pattern for large Pail A
Half Pattern Bottom for large Pail
Double Seamed Bottom
MINNOW PAIL
Harry Wall


Chamber part D
Cut round opening in bottom of Pan
Chamber part E
Lap for soldering
Chamber part F
Half Pattern
Hinge with #18 Wire
G Cover
Cover Latch
Air Valve from Inner Tube
Section L
Wire Mesh laps 1" on lower + upper ends. Solder about every other wire.
#4 or #6 Mesh Wire Cloth
DETAILS OF MINNOW PAIL

MINNOW PAIL

Harry W. Kroll, Buhl, Minn.

The season for the use of the minnow pail is again at hand. The offering of an extra problem having seasonal interest to elementary students is therefore very desirable. The problem shown herewith, presents an opportunity for the boy to use his ingenuity in creating a project involving many of his own ideas.

The accompanying illustration is only a suggestion as to the kind of construction that may be considered. The student may supply almost all of his own material from discarded pans and pails. If tin plate from the shop is used, use IC tin plate unless otherwise specified. Construct the large pail first. Be certain that the proper allowances are made for the grooved seam to insure a diameter of 8¾ in. Use No. 10 galvanized wire for wiring the pail and No. 8 for the handle. Fasten the handle to the pail with 1¼ by 1⅛-in. kettle ears. Solder the double-seamed bottom water-tight.

In constructing the inner pail, be sure that the wire edge rests on the top edge of the outer pail. The outside pan of the air chamber is made first. Before burring up the bottom of the pan for double seaming, cut out the required opening of 4⅜ in.

Now cut out piece F and E. Put a 3/16-in. single hem on one edge of E and form the piece into a cylinder in the forming rolls. Slip it into the opening of the bottom of the pan and adjust it to fit tightly all around. Remove and solder the ¼-in. lap joint. Burr up ⅜ in. on the remaining edge water-tight as shown in the sectional drawing of the assembled pail. Put the remaining piece F in place and tack with solder every few inches before making a permanent joint. Now sweat a very light line of solder where pieces F and E join at K. There is left approximately ⅛ in. of material at F, extending out beyond where E joins K. Turn this extra material down with light taps of the hammer and solder the entire joint water-tight. Give the air chamber a water test to find possible leaks.

Construct pieces B and C as laid out in the drawing. Pan B contains the minnows when the inner pail is removed. Piece C is formed with single hems on the outside and a grooved seam for the joint. B is constructed with a double-seamed bottom and a single hem turned on the outside at the top edge.

From the wire cloth into a cylinder and overlap one edge ¼ in. Use stovepipe wire to weave the lap together the entire length of the cylinder. Fit the wire cylinder into pieces B and C, extending ¼ in. into each piece and solder about every other wire.

Now set the air chamber D down on C and solder securely in place.

Cut out a piece of galvanized iron for the cover as shown at G and hinge it in place on F so that it extends evenly over the hole.

The device used for a latch is also made of galvanized iron. It is shaped with enough spring to hold the cover in place quite tight.

The ring attached to piece F is used for attaching a rope when the inner pail is thrown overboard while fishing.

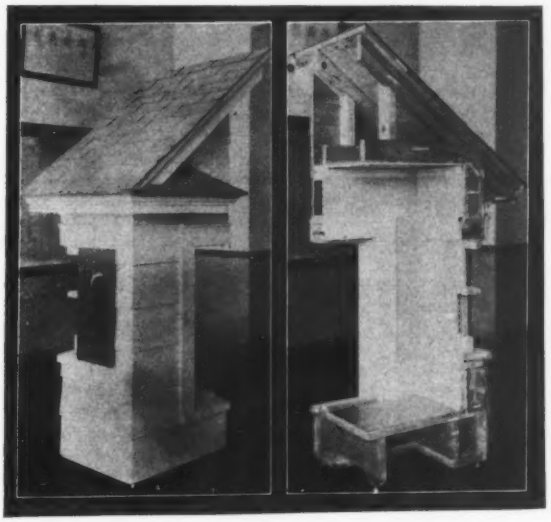
One of the newest features of a minnow pail is the device for supplying the water with oxygen. Section L shows how the valve stem of an inner tube is attached to the pail through which air is forced into the water, thereby prolonging the life of the minnows many hours. Any auto pump will do the work. Minnows cannot always be secured just where the fishing is to be done, thus necessitating their conveyance in a very small quantity of water several hours. They die from the lack of oxygen, not from lack of space or warmth of water.

The two pails may be enameled a deep green or any other suitable color.

HOUSE SECTION

Howard W. Boekeloo, Kalamazoo, Mich.

The house section shown in Figures 1 and 2, was built in the carpentry classes of Central High School at Kalamazoo, Mich., in response to a demand for a practical model in the architectural-drawing and carpentry classes. The material was contributed by a local lumber dealer who was glad to furnish it in exchange for a loan of the house section for the local annual home show. The style throughout was colonial



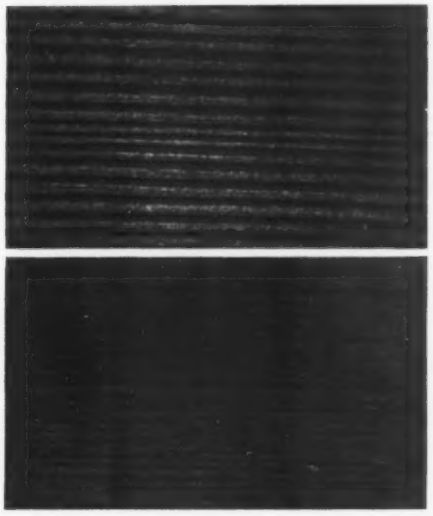
FIGS. 1 AND 2

in character and all materials used were full size taken directly from the dealers stock. The height, however, was cut down to allow for convenience in moving. All finishing was in accordance with building practice; ivory paint with a green shutter for the exterior, ivory enamel for the trim, varnished and waxed oak floor and stippled plaster. Each part was carefully marked showing its proper name and size.

TO PAINT OR NOT TO PAINT

The accompanying illustrations show the results of tests made by the U. S. Forest Products Laboratory at Madison, Wis., on the effect of weathering on painted and unpainted surfaces.

The upper illustration shows the "washboard" effect produced on unpainted wood, because of the permanent set



resulting from the differences in the swelling and shrinking of spring wood and summer wood.

The lower illustration shows a similar piece of edge-grain board of the same species which was given three coats of ordinary house paint and exposed for the same length of time. The irregularities shown on this lower piece are merely the brush marks left by the painter.

Painting is the best means known for protecting exposed wood against the weather.

THE BOSTON VOCATIONAL MEETING

The monthly meeting of the Boston Vocational Education Society was held on Saturday, February 9, at the Hotel Hemenway, Boston. As this meeting was arranged for the purpose of visiting the Boston Trade School for Girls, the wives and friends of the members were invited. A considerable number availed themselves of the opportunity to attend the meeting. After the luncheon, the party adjourned to the Girls' Trade School.

On arriving at the school the party was welcomed by Miss Florence Leadbetter, the director of the school, who immediately started the group off on a tour of the shops and classrooms.

The building is unique as far as trade schools are concerned, for it was formerly the home of Mr. R. H. White, a wealthy Boston merchant. The structure, which is situated in the beautiful Fenway section of Boston, was built at a cost of approximately $1,500,000. The city, however, was given the opportunity to purchase the building at a figure barely covering the cost of the land. The building was so well adapted to the needs of the school that it was necessary for the city to spend less than $1,000 to fit it for occupancy. The rooms are large enough to take care of the students in each class and at the same time give it the atmosphere of a separate shop. The fireplaces and luxurious interior finish give the girls from the poorer homes an opportunity to view the home of a wealthy citizen at close hand and should help them appreciate real artistic surroundings.

After touring the building the group was given an informal talk by Miss Leadbetter on the history and problems of the school. The school rates high among the trade schools of the country and is considered a close second to the Manhattan Trade School for Girls.

The school was opened in July, 1904, under the auspices of the Massachusetts Association of Women Workers, with Edith M. Howe as president, a little less than two years after the opening of the Manhattan Trade School. It started with a ten weeks' course in sewing and dressmaking. In the fall term a course in millinery was added, and later one in power-machine operating. The aims of the school, as outlined at that time, were as follows:

1. To reach girls obliged to go to work early with a limited amount of time for training.
2. To train for the trades under workshop conditions.

Some of the problems encountered were:

1. To formulate a brief course of training intensive enough to produce skilled workers.
2. To balance the shortness of time by specialization and efficiency.
3. To gain the recognition of the employers of the value of a trade-school training.
4. To bring the initial wage of the trade-school girl up to at least $4 per week.
5. To systematize expenses and lower the per capita cost to a figure possible for public-school budgets.

When the Douglas Commission was organized to investigate the need of industrial schools in 1905, the Boston Girls' Trade School was taken by them as a working model. Also in 1906 by the Industrial Education Commission under Mr. Paul H. Hanus which advised the establishment of industrial schools under state aid.

In 1909 the school was accepted by the Boston school committee as the first state-aided industrial school in Massachusetts. The school was then moved to 620 Massachusetts Ave. In 1912 a two-year course was established, and trade-school certificates were granted at the completion of the course. No certificate was to be given for less than 240 days of attendance and six months of satisfactory work after placement. During 1913 courses in catering and commercial art were added.

By 1922 the enrollment had reached a thousand, and in 1923 the present building was obtained. "Thus the gilded palace of R. H. White became a training school for earnest and honest lovers of work." A summer school was organized as a separate unit, under Miss Rebecca Anslow. Workers are permitted to return any time for additional instruction and may take advantage of the opportunity to prepare for better positions.

The meeting adjourned at 4:15 p.m.—*Louis A. Van Ham.*

THE CHICAGO DISTRICT INDUSTRIAL-ARTS ROUND TABLE

The February meeting of the Industrial-Arts Round Table was held on Friday, February 15, in the tea room of the Art Institute. Fifty-two members were in attendance. Representatives come to the meetings of this organization from schools within a radius of forty miles in the heart of Chicago.

The program was different from that of the January meeting. At the latter, those attending broke up into conference groups to discuss problems along the lines of drafting, auto mechanics, printing, electrical work, machine shop, and industrial arts. The last named subject was intended to include woodworking, general shop and types not included under the other headings.

Two speakers occupied the entire time at the February meeting. Professor Emery Thomas Filbey, of the University of Chicago and Director of the Institute of Meat Packing, spoke on the subject, "The Institute of Meat Packing; An Experiment in Vocational Education." He outlined the course of development of the institute, giving a comprehensive view of its progress. Many difficulties were encountered in building up a literature for use as material for those enrolling in the institute. Differences in practice were harmonized and evaluated. Current practice was scrutinized by engineers, chemists, biologists, economists, and statisticians. All this information is now being carried back to the men actively engaged in the industry to improve their technique. Both the university and the industry received the benefits of such an alliance.

The second speaker was Mr. W. J. Malcolmson, principal of the Hawthorne Club Evening School. This school is one of the activities of the Hawthorne Club, an organization of members of the Western Electric Company's Hawthorne Works, Chicago. During the past year, there were 3,325 enrollments, 126 classes and 66 instructors. General cultural as well as technical subjects are taught, 45 courses being listed in the school bulletin. Mr. Malcolmson's topic was "Industrial Education from the Viewpoint of Industry." A thoroughly organized and highly specialized company like the Western Electric Company maintains training units for its technical workers, and so general education receives more stress in checking qualifications of employees than one would expect. Mr. Malcolmson suggested that health, personality, intelligence and education should be the four requirements for employment and possibly in the order named.

The March meeting will be held at Joliet Township High School, Joliet, Ill., on March 22. This is in accord with the plans of the club to visit some school on the occasion of every second or third meeting.—*Wm. C. Brubaker.*

THE EASTERN ARTS ASSOCIATION CONVENTION

The twentieth annual meeting of the Eastern Arts Association will be held April 2 to 5, in New York City. The headquarters for the meeting will be in the Hotel Pennsylvania, which offers exceptional accommodations for a large meeting, as well as rooms for small meetings, banquets, and exhibits of school materials and equipment.

An especially fine program has been prepared for the meeting by Mr. Joseph Wiseltier, vice-president of the association. The following is the list of speakers and the topics which they will discuss:

General Session

Tuesday, April 2

Some Basic Considerations Affecting Success in Teaching—Dr. William H. Kilpatrick, Teachers College, Columbia University, New York, N. Y.

A Modern Conception of the Development of Art—Mr. Leo Katz, Metropolitan Museum of Art.

Wednesday, April 3

Addresses of Welcome—Hon. James J. Walker, mayor of New York City; Hon. George J. Ryan, president of the board

of education of New York City; Dr. William J. O'Shea, superintendent of schools of New York City.

Art, Industry, and Education—Mr. Gerrit A. Beneker.

The Teaching of Art in the Machine Age—Miss Grace Cornell, Newark, N. J.

Friday, April 5

The Contribution of Art Education to the Growth of High-School Pupils—Mr. John L. Tildsley, district superintendent of schools of New York City.

Vocational Education: An Obligation of the State—Dr. A. B. Meredith, state commissioner of education of Connecticut.

Modern Art, Now and Hereafter—Mr. Frank Alvah Parsons, New York School of Fine and Applied Arts.

Education for Successful Living—Mr. Edwin C. Broome, superintendent of schools, Philadelphia, Pa.

Home-Economics Section

Wednesday, April 3

Art Education for the Consumer—Miss Velma Phillips, New York City.

Thursday, April 4

Art Education in Industry—Mrs. Mary Davis Gillies, Gardner Advertising Co., New York City.

Color in Dress—Miss Grace Cornell, Newark, N. J.

Fine-Arts Section

Wednesday, April 3

Popularizing Art Instruction—Mr. James A. Boudreau, School of Fine and Applied Arts, New York, N. Y.

The Creative Arts in the New Education—Dr. Harold Rugg, Teachers College, Columbia University.

Thursday, April 4

A Course in Art for Boys—Miss Virginia Murphy, Erasmus Hall High School, New York City.

The Significance of the Modern Art Movement and Its Relation to Education—Mr. William Zorach, New York, N. Y.

Manual-Arts and Vocational-Education Section

Wednesday, April 3

Vocational Guidance Through Manual Arts—Dr. Harry D. Kitson, Columbia University, New York, N. Y.

Objectives and Content for an Industrial-Arts Program in Junior High Schools—Mr. John J. Hatch, State Normal School, Newark, N. J.

Thursday, April 4

How to Make an Educational Chart to Assist the Industrial-Arts Teacher—Mr. Lawrence J. Young, New York, N. Y.

Raw Material—Mr. Raymond W. Perry, state supervisor of industrial education for Rhode Island.

The Development of Character Traits as a Phase of Vocational Education—Prof. F. K. Shuttleworth, department of education, Yale University.

THE MEETING OF THE TULSA MANUAL ARTS CLUB

The regular February meeting of the Tulsa Manual Arts Club was presided over by Mr. C. O. Weger, newly elected president. After the usual get-together dinner, the members of the club turned their attention to the topic of the evening, that of "Aviation."

"Training for Airplane Pilot" was the subject of Mr. Collier's talk. He pointed out that in order to become a pilot, one needs a high-school education; one must be physically sound; must have a knowledge of engine mechanics; must have had some 200 hours of "solo" flying experience; and must have passed a satisfactory examination. The speaker explained that is a rather expensive matter to become an aviator, as each hour of flight costs somewhere from $15 to $20. He said further that the number of planes being manufactured to be flown this year far exceeds the available supply of licensed pilots, so that there is still ample room for the ambitious student in aviation.

"Training for an Airplane Mechanic" was discussed by Mr. Charles Fleischman, who stated that a mechanic should have two years of experience on airplane motors in order to become a licensed mechanic, in addition to passing an examination in both the theory and practice of airplane motors. Legal requirements governing the licensing of aviation mechanics are a great deal more strict than the qualifications necessary to become an automobile mechanic. The best way to obtain such training at present is to secure employment in an airplane manufacturing company, to enter the army or navy air service, or to serve as helper to a licensed airplane mechanic on an airplane field.—*J. W. Bollinger.*

VOCATIONAL TEACHERS OF PITTSBURGH HOLD MEETING

An interesting meeting of the vocational and industrial-arts teachers of Pittsburgh and vicinity was held on February 4, at the Frick Teacher Training School. Dr. G. D. Whitney, director of the vocational department of the University of Pittsburgh, presided.

Dr. C. A. Prosser, of Dunwoody Institute, Minneapolis, the principal speaker, discussed the subject, "Habit," in which he described the views of the different schools of psychologists and the work of the experimental psychologist. Dr. Prosser commented on present-day methods of instruction in the schools and pointed out that the "trouble shooter" is one of the best examples of thinking as the world thinks. He emphasized that instruction in arithmetic, laboratory work, science, industrial arts, and experimental agriculture as the best agencies to teach people to think. In shopwork he pointed out that the student should use his initiative and learn to think as he goes along. The teacher should act only as the "pusher engine" to help the student when he needs help. The industrial-arts instructor, he said, should consider his work as important as that of the teacher of academic subjects, and should continually keep in mind that the boy will one day need all the teaching skill when he applies at the factory gate or the store door for work.

At the close of the meeting, Dr. Whitney commented on the new courses being offered at the University of Pittsburgh during the second semester.—*G. C. Donson.*

THE OKLAHOMA VOCATIONAL MEETING

The twenty-third annual meeting of the Oklahoma Educational Association, held February 7, 8, and 9, at Oklahoma City, was the occasion for the organization of the Oklahoma Vocational Association. In their regular session, the vocational teachers adopted a constitution and voted to affiliate themselves with the American Vocational Association.

Dr. R. L. Cooley, director of the Milwaukee Vocational School, talked on part-time education. Dr. Cooley showed that, while most pupils go through the six grades of the common school, only a small proportion of them continue in school beyond that grade, and that a greater and greater number are leaving school to enter business and industry. He pointed to the large amounts of money spent for high-school and college education, although only a small percentage of pupils go through the high school, and a still smaller percentage go on to college. Dr. Cooley argued for part-time education for the pupils who leave school to go to work on the basis that they are as much entitled to an education as the pupils who go on to high school.

Following the address by Dr. Cooley, the meeting divided into sectional meetings for the discussion of problems connected with woodwork, mechanical drawing, general shop work, electricity, auto mechanics, printing, and part-time education.

INDUSTRIAL-ARTS TEACHERS OF SOUTHERN WISCONSIN MEET

The industrial-arts teachers of southern Wisconsin held a meeting recently, with 45 members present. The society is a new organization which has for its purpose the improvement of teaching methods in industrial arts. Among the speakers at the meeting were Mr. Edgerton and Mr. H. W. Schmidt. Mr. Schmidt gave a report of the committee in formulating objectives in manual arts. Mr. E. G. Lamoreau, of Janesville, gave a report of the progress of the organization in the improvement of teaching.

It was voted to hold an all-Wisconsin luncheon and business meeting in Milwaukee next November. A resolution was passed that industrial-arts groups of all sectional organizations be asked to publish their proceedings in order that all industrial-arts teachers and supervisors in the state may benefit.

THE VOCATIONAL EDUCATION MEETINGS AT CLEVELAND

The vocational-education section of the National Education Association held a meeting in connection with the department of superintendence at Cleveland, Ohio, Feb. 24 and 25. This year's meeting, which had an increased attendance, carried out an effective program, and offered an exhibit by nearly four hundred firms.

A brief outline is given of the four programs arranged by the department of vocational education, and presented to groups averaging about one hundred persons. The general topic was "How Can Education Best Serve Democracy?" An effort was made to have all addresses in both the general and sectional meetings harmonize with the general topic, and to bring viewpoints from all parts of the country. How well the meetings of special interest contributed to these ends may be judged by the character of the program presented.

At the agricultural section, Dr. W. F. Stewart, of Ohio University, presided. The speakers were Mr. H. C. Fetterolf, Harrisburg; Prof. W. H. Lancelot, Ames, Iowa; Prof. H. G. Kenestrick, Columbus.

At the section for selected institutions, Dr. John C. Wright, of the Federal Board for Vocational Education, presided. The speakers were Mr. B. F. Comfort of the Cass Technical High School, Detroit, Mich.; Mr. L. M. Anderson, Lakeside Press, Chicago, Ill.; Mr. R. T. Craigo, Dunwoody Institute, Minneapolis, Minn.; Miss Ora Blanchar, Girls' Trade School, Milwaukee; Dr. R. L. Cooley, Central Vocational School, Milwaukee.

At the manual-arts section, Mr. M. M. Proffitt, of the U. S. Bureau of Education, presided. Mr. James Killius, Johnstown, Pa., Mr. D. W. Castle, Joliet, Ill., Mr. George Gregory, Duluth, Minn., Mr. H. E. Wood, Indianapolis, and Mr. W. E. Roberts, Cleveland, Ohio, were the speakers.

At the general program, Mr. Homer J. Smith, of the University of Minnesota, presided. Among the speakers were Dr. Howard L. Briggs, Miss Adelaide Steele Baylor, Dr. W. F. Stewart, and Mrs. Anna L. Burdick.—*Homer J. Smith.*

HOLD EIGHTH ANNUAL CONFERENCE ON PRINTING EDUCATION

The eighth annual conference on printing education will be held June 24 to 26 at Carnegie Institute, Pittsburgh, Pa.

The tentative program which is in process of completion, includes a large list of speakers comprising educators and leaders in the printing industry. Among the topics to be discussed at the meeting are:

What Education Offers the Printing Industry.
What the Printing Industry Offers Education.
Mechanical Advances in the Industry.
Progress in Trade Tests.
Problems in the Preparation of Vocational Curricula.
The Outlook for Vocational Education.
The Continuation School.
Craftsmanship and Education.
Paper and Typography.
Technical Research—The Next Step in Printing Education.

Two special features of the meeting will be the exhibit of the printed product, and a dramatic presentation on Printing Education on Trial. The exhibit will be in two parts, one of which will be a special exhibit of the printing of commerce, donated to the U. T. A. Department of Education by the American Institute of Graphic Arts, and an exhibit of instructional methods of interest to teachers of printing.

Mr. F. J. Hartman, director of education of the United Typothetae of America, Chicago, Ill., is the chairman of the general committee, and Mr. Joseph M. Speer is chairman of the Pittsburgh committee on conference arrangements.

FIFTH ANNUAL CONFERENCE ON EDUCATION

The fifth international conference of the new education fellowship will be held August 8 to 21, at Elsinore, Denmark. Among the speakers will be Prof. Franz Cizek of Austria, Dr. O. Pfister, Dr. Maria Montessori, Dr. Ovide Decroley, Dr. Paul Dengler, Prof. William Boyd, Dr. Adolphe Ferriere, Dr. Elizabeth Rotten, Miss Helen Parkhurst, Dr. Raup, and Rabindranath Tagore.

The American delegation which is to attend the meeting is being formed by the American advisory committee, of which Dr. William Kilpatrick of Columbia University is president, and Dr. Harold Rugg of Lincoln School is chairman.

TEACHERS' CLUB AT ENID, OKLA.

The industrial-arts teachers of Enid, Okla., have organized a luncheon club, which meets the first Saturday of every month. Mr. M. G. Sears, of Enid, has been elected president; Mr. W. S. King, secretary; and Mr. N. M. Connett, treasurer.

ANNOUNCE MEETING OF MICHIGAN VOCATIONAL SOCIETY

The Michigan Society for Manual Arts and Industrial Education will hold their annual convention in Lansing, the state capital city, April 25, 26, and 27. An attendance of 500 is anticipated at the several section meetings and general assemblies.

Dr. William T. Bawden, managing editor of the Industrial Education Magazine, a nationally known authority in manual-arts education, will be the principal speaker at the Friday evening general session.

Dr. Paul Voelker, president, Battle Creek College; Mr. F. E. Searle, superintendent of the Henry Ford Trade School; Supt. Harvey Lowry of the Fordson Public Schools; and Mr. Marshall Byrn, of the manual-arts department, University of Michigan High School, are other prominent educators appearing before the general sessions.

AMERICAN FEDERATION OF ARTS MEETING

The American Federation of Arts will hold its annual meeting May 22 to 24, at Philadelphia, Pa. The headquarters for the meeting will be at the Bellevue-Stratford Hotel.

NOW, ARE THERE ANY QUESTIONS?

Coloring Electric Light Bulbs

863. Q.: I would like to dye some electric bulbs but do not seem to be able to find out just what kind of dye is used. I wanted to use the colors red and blue, and wondered if you might be able to give me a recipe for the dyes or tell me what kind of dye is used, and where I might get it.—*R. S.*

A.: Two substances suggest themselves as excellent vehicles of color, and both are water soluble—water glass (potassium or sodium silicate), and gelatin. For tinting, water-soluble aniline colors should be tried. The thickness of the solution must be a matter of experimentation. Prior to dipping the globes they should be made as free as possible from all grease, dirt, etc. The gelatin solution should not be so thick that any appreciable layer of it will form on the surface of the glass, and to prevent cracking, some nondrying material like glycerine should be added to it.

Cold Glue

865. Q.: I have read recently of a cold glue that could be prepared for shop purposes. Would you kindly give me the name of any manufacturer who makes such a glue as we find it very expensive to buy the commercial liquid glue for shop purposes.—*G. O. L.*

A.: Have you ever tried casein glue? This glue can be bought in bulk. Before using, it is mixed with cold water as directed by the manufacturer. If properly made and properly used, good results are achieved with it. It can be obtained from the Monite Waterproof Glue Co., Minneapolis, Minn.

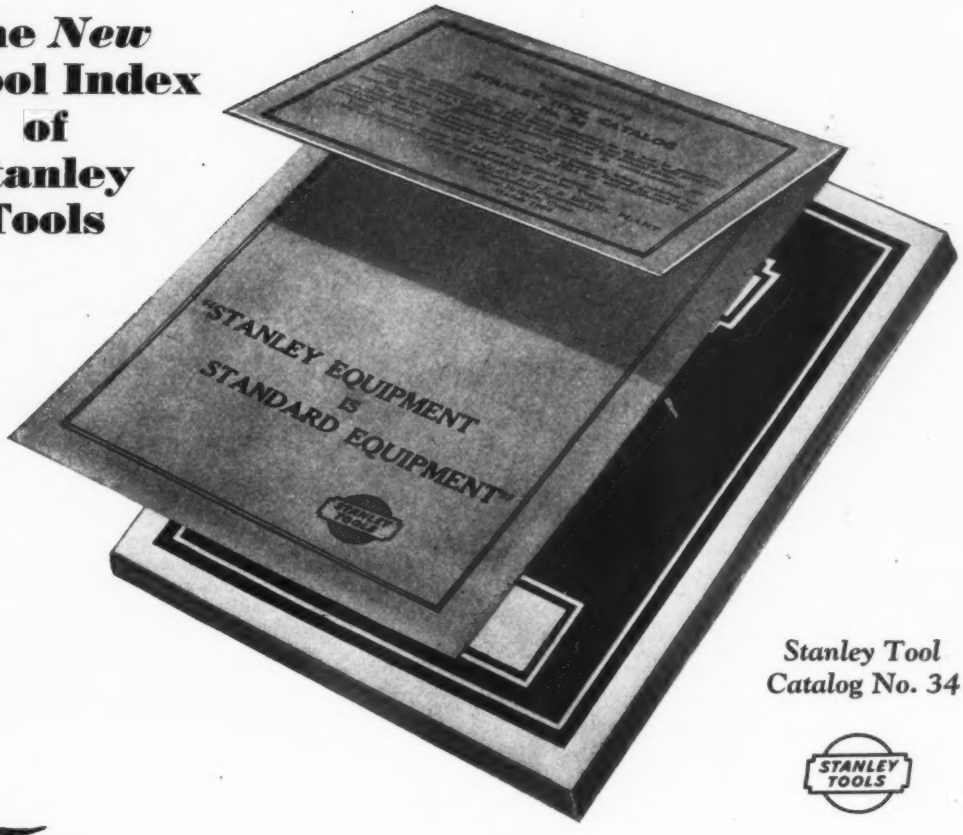
Apprenticeship

866. Q.: I am cooperating with the Transue & Williams Steel Forgings Company, Alliance, Ohio, in setting up a program for apprentice training in their die-sinking department. I shall appreciate very much receiving such literature and

(Continued on Page 30a)

A Useful Guide for School Shop Equipment

The *New* School Index of Stanley Tools



Stanley Tool Catalog No. 34

THIS condensed index has been compiled to help the instructor in the selection of tools for the school shop. Based on our experience and our study of tools, we recommend the items listed to meet the trying conditions of the school shop.

It is keyed for the work in the Elementary and Junior High School, the Senior High School or Vocational School, and a choice is mentioned on many items.

Send for the late edition of our catalog which shows our new tools. You should also have a copy of this index as a reference for making your Spring requisitions for tools as well as repair parts.

The Stanley Rule & Level Plant
Educational Department
New Britain, Conn.

STANLEY TOOLS

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Gentlemen: Please send me
School Index of Stanley Tools
Stanley Tool Catalog No. 34

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Points on Drill Grinding

Putting a proper point on the business end of a twist drill doesn't sound hard—but the fact is that 11 pages, or practically 25% of the "Handbook for Drillers," are devoted exclusively to this all-important thing. In reality pointing a twist drill is a delicate piece of work calling for great skill, and much advance knowledge.

If you would like copies of the Handbook for the use of students in machine shop practice, we shall be glad to send them to you, without charge, in any reasonable quantities.

The CLEVELAND TWIST DRILL COMPANY CLEVELAND NEW YORK-CHICAGO-LONDON SAN FRANCISCO

TRADE MARK REG. U. S. PAT. OFF. AND FOREIGN COUNTRIES

(Continued from Page 168)

suggestions from you as will facilitate the work of organizing our plan and program. I am especially interested in securing copies of apprenticeship contracts used by various companies, also outlines of apprentice-training courses, physical examination blanks, apprentice application forms, etc., etc.

Should you be acquainted with other drop-forging companies which have apprenticeship programs for their die-sinkers, I shall be glad if you refer me to them. Any assistance or suggestions you may give us will be greatly appreciated.—*E. B. S.*

A.: Information relative to apprentice contracts, apprentice courses, etc., can be obtained by writing to the Supervisor of Apprenticeship, Industrial Commission, Madison, Wis. You can also get very good information by writing to Mr. C. Freund, Supervisor of Apprentices, The Falk Corporation, Milwaukee, Wis., who has done outstanding work in the line of apprenticeship training; also to Mr. L. S. Wiggins, Employment Manager, Allis Chalmers Mfg. Co., West Allis, Wis.

I do not know of any particular companies employing apprentices in their drop-forge departments, but no doubt you could get some information from the Industrial Commission of the State of Wisconsin on this particular trade.

Removing Glue Stains

867. Q.: I have been using a waterproof glue, "Monite" to be more specific, and I find that it stains the wood. Is there anything that can be used to remove this stain?—*D. F. M.*

A.: Monite glue belongs to the casein group and hence is based on a lime reaction, with casein. In contact with tannin bearing woods, the result is apt to be a gray or brown discoloration, generally requiring bleaching.

This has been a production problem ever since casein glues were first introduced to the furniture and plywood industries. In both, the trouble has been largely overcome by greater care in the application of the glue, enough being applied to the joints to satisfy them, but on the other hand avoiding such an excess that more than a mere trace is extruded, upon the application of pressure. This is best done by running the edges to be joined over a glue roller immersed in the glue supply, thereby avoiding the dripping usual to brush application.

Where the stains cannot be avoided, they can generally be bleached by treating with a solution of oxalic acid, four ounces per half gallon of hot water. This is applied with a fiber scrubbing brush, allowed to partially dry and followed by a hot solution of borax, one pound per gallon of hot water. When dry, sand clean. Rebleach if the first treatment is not sufficient.—*Ralph G. Waring.*

AMONG the INDUSTRIAL ARTS TEACHERS

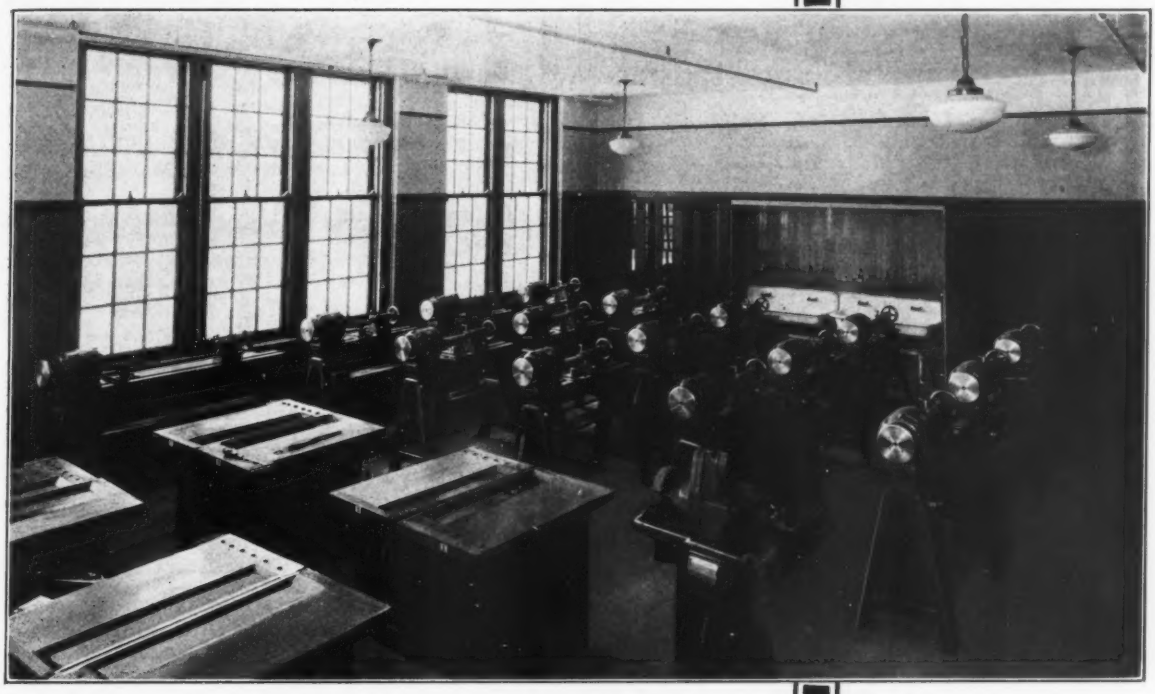
ROBERT J. LEONARD DIES

Prof. Robert J. Leonard, of the school of education of Teachers College, Columbia University, died suddenly at his home in New York City on February 9, following a brief illness of influenza. Professor Leonard was head of the department of vocational education at Indiana University from 1914 to 1917, and later was a special agent of the Federal Board for Vocational Education. He had been head of the school of education at Teachers College for several years and was considered an authority in his field.

Mr. Albert Lange and **Mr. F. L. Lane** have been reelected as members of the vocational school board at Beloit, Wis.

Mr. F. W. Voss, manual-training instructor at the Waukegan Township High School, Waukegan, Ill., died at his home after an illness of one week due to pneumonia. Mr. Voss was a graduate of the Iowa State College at Ames, and had taught at Watertown, Wis., and at Stout Institute, Menomonie.

Mr. Joseph B. Funke has been reelected president of the vocational school board at La Crosse, Wis.



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THE reputation of the No. 12 Speed Lathe is enough to fix its superiority in the mind of every prospective lathe purchaser. Its overwhelming popularity is amply attested by such installations as the Jackson Intermediate School of Detroit shown here.

But you are not asked to consider the No. 12 on that basis alone. Learn of its records of service in school shops. Learn how much more convenient is the single handle control, and why it makes the No. 12 safer to operate; learn about the more efficient motor, the massive, vibration-proof construction of the entire machine and many other superior features. Ask us for the illustrated bulletin; it gives full details of its construction.

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Jackson Intermediate School

Installs

16

No. 12 Speed Lathes

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Ask for this

WALL CHART

It is a large chart that can be hung in the classroom or work shop, giving a large illustration of the machine with several smaller views showing how to operate the lathe on different kinds of work. It will prove of assistance in your instruction on lathe operation.

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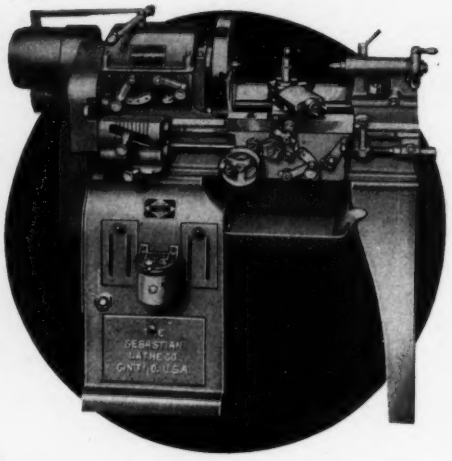


Incorporate these specifications in your next request for bids—

(....) Lathes Gold Seal or equal—Swing 11", bed length 4', to be 8 speed geared head, full quick change box with no loose gears, to cut threads 3-96, feeds .007 to .156, all steel gears, 1 5/16" hole through spindle, collet capacity 7/8", bearings of main spindle 2 3/16x2 3/4—1 13/16x2 1/4", to be taper gibbed throughout, motor drive with motor fitted in leg under headstock with a tool cabinet in the leg below the motor compartment, tumbler yoke for cutting left-hand threads with the depth of the teeth already adjusted on the quadrant for throwing over to a left-hand thread, lathe to be bronze bushed wherever required. Macit tool post screw. Silent chain drive with easy adjustment for stretch in the chain, lathe to be fitted with a safety shearing pin, graduated compound rest and tailstock bases, tailstock center oiler, friction type collars on compound rest and cross feed with these collars graduated, accuracy alignment test .0005, motor and control to be (Specify here type current and type of control wanted). Each lathe to be furnished with a chip pan, depth thread chasing stop, centers, thread chasing dial, steady rest, and wrenches. The lathes shall all be furnished with all gears guarded by cast iron guards, and the operation of the lathe for stop and start shall be through a friction on the headstock controlled by a lever within easy reach of the operator so that the motor can run constantly when machine is in operation. The apron of the lathe shall have a safety device to prevent both longitudinal feeds being thrown in at the same time.

Add here list of extras wanted such as, Chucks, Taper Attachment, Draw-in Attachment, Collets, Tools, Dogs, etc.

THE SEBASTIAN LATHE CO.
CINCINNATI, OHIO
NEW YORK OFFICE—Room 372—50 Church St.

NEW PUBLICATIONS

New Practical Physics

By N. H. Black and H. N. Davis. Cloth, 645 pages, 5 by 7⅜, illustrated. Price, $1.20. Published by The Macmillan Co., New York City.

This is a very profusely illustrated textbook on general physics. Its lucid explanations of how to apply scientific principles to practical everyday problems will make this new physics a book to be welcomed by all high-school teachers of physics.

The Nature and Meaning of Teaching

By Ralph F. Strebel and Grover C. Morehart. Cloth, 273 pages, 5½ by 8, illustrated. Price, $2.50. Published by McGraw-Hill Book Company, New York, N. Y.

The authors of this book have succeeded in producing a volume which is really worth while. The material is well arranged and gives a very good oversight of the development of the modern philosophy of education, showing step by step, although briefly, how it has come down to us from Socrates and his successors.

Not everyone will agree with the authors, of course, in such statements as the following: "The first American schools started from the top downward. Early American history shows that the controlling passion of our colonial forefathers was religion. . . . But it was very quickly recognized by the colonists that the services of these men of God would sometime or other cease, so the necessity of training others to take their places became apparent."

The newer conceptions of education are well presented and the mechanics of classroom teaching are clearly stated. The copious references for field study at the end of the chapters, together with the problems and exercises, and the graphic representation of a summary of the contents of each chapter, make the book a valuable contribution to the general stock of educational literature.

Furniture

By the Century Furniture Co., Grand Rapids, Mich. Cloth, 156 pages, 5½ by 8½, illustrated. Price, $1.00.

This small book will be welcomed by teachers of cabinet-making as well as designers of furniture. It is devoted entirely to a discusion of periods and styles. It is very well illustrated and a chronological of furniture styles in English, French, and American is appended.

How to Sketch From Life

By L. A. Doust. Cloth, 63 pages, 5⅜ by 8½, illustrated. Price, $1. Published by the Bridgman Publishers, Pelham, N. Y.

This small book, which contains but 63 pages, will be found very helpful by the student who wants to learn sketching from life. The directions are brief and the author has an interesting way of summing up in a few words the contents of each chapter. The illustrations given in the book are very helpful.

Pupil Counseling in Grades Seven to Twelve

By F. L. Stetson and C. L. Huffaker. Paper, 22 pages, 6¾ by 10. Published by the University of Oregon, Eugene, Oreg.

This small pamphlet gives a great deal of valuable information about the organization of a counseling program. It outlines the method of procedure, the use of intelligence and achievement tests, how to obtain information about occupations, and how to make use of all of the factors in the actual processes of counseling.

Home Economics Home Project Record Book

By Jessie W. Harris. Paper, 29 pages, 8⅜ by 10¾. Price, 25 cents. Published by Houghton Mifflin Company, Boston, Mass.

(Continued on Page 35a)

(Continued from Page 32a)

This pamphlet is arranged on the project-plan method for supervised home practice and home-project work on the subject of home economics. The method of work is explained in a few introductory paragraphs to the pupil. The rest of the pamphlet is given over to checking sheets on which the various jobs are listed and this list is following by form sheets upon which the project outlined and record is kept. The last two pages are given over to notes to the teacher and directions on how class time may be used for home projects.

Analysis of the Plumbing Trade
Analysis of the Steam-Fitting Trade

Paper, 8⅜ by 10⅜. Published by The Educational Department, Plumbing and Heating Industries Bureau, 35 East Wacker Drive, Chicago, Ill.

This material, in mimeographed form, is merely a suggestion of a method to be followed in outlining and setting up the course of training for instructors and apprentices in the plumbing industry. The material consists of an analysis in which the trade information and related subjects are listed opposite type jobs. Groups 5, 6, and 7 are covered in this particular part of the analysis, and they embrace jobs in cast-iron pipe work, screw-pipe work, soldering, joint wiping, roughing in, fixture setting, rural sanitation, trouble shooting, and repairwork. A similar suggestive analysis of the steam-fitting trade, lists jobs under the following headings: Making up pipe work, installing boilers and piping, installing accessories and mechanical appliances, insulating and bronzing, and repairwork.

Elementary Foundry Technology

By L. A. Hartley. Cloth, 408 pages. Price, $3. McGraw-Hill Book Co., New York City.

This book provides a basic statement of the principles and methods of foundry practice as applied to the manufacturer of gray iron and steel castings. It is especially well adapted to a complete course for apprentices who are in need of basic information on the principles of chemistry, physics, mechanics, and strength of materials.

Techniques

Paper, 18 pages. Price, 50 cents. Published by Charles M. Higgins & Co., Brooklyn, N. Y.

This pamphlet is an exhaustive treatise on drawing and rendering in pen and ink, which is intended for the use of architects, draftsmen, artists, and instructors. Extreme care and attention was given in the series of illustrations showing the various types of artwork executed in Higgins' drawing inks, both blacks and colors. The cover was designed by Harvey Hopkins Dunn, who is a master of decorative ornamentation and design. An unusual antique paper of extraordinary texture has been used in the preparation of the pamphlet in order that the numerous illustrations might show up to the best advantage.

Architects and instructors in architecture and allied subjects may obtain a copy of "Techniques" gratis, provided the request is made upon a personal or business letterhead, or by stating their business or educational affiliations.

To students a charge of 25 cents per copy will be made. Address: Educational Department, Charles M. Higgins & Co., 271 Ninth St., Brooklyn, N. Y.

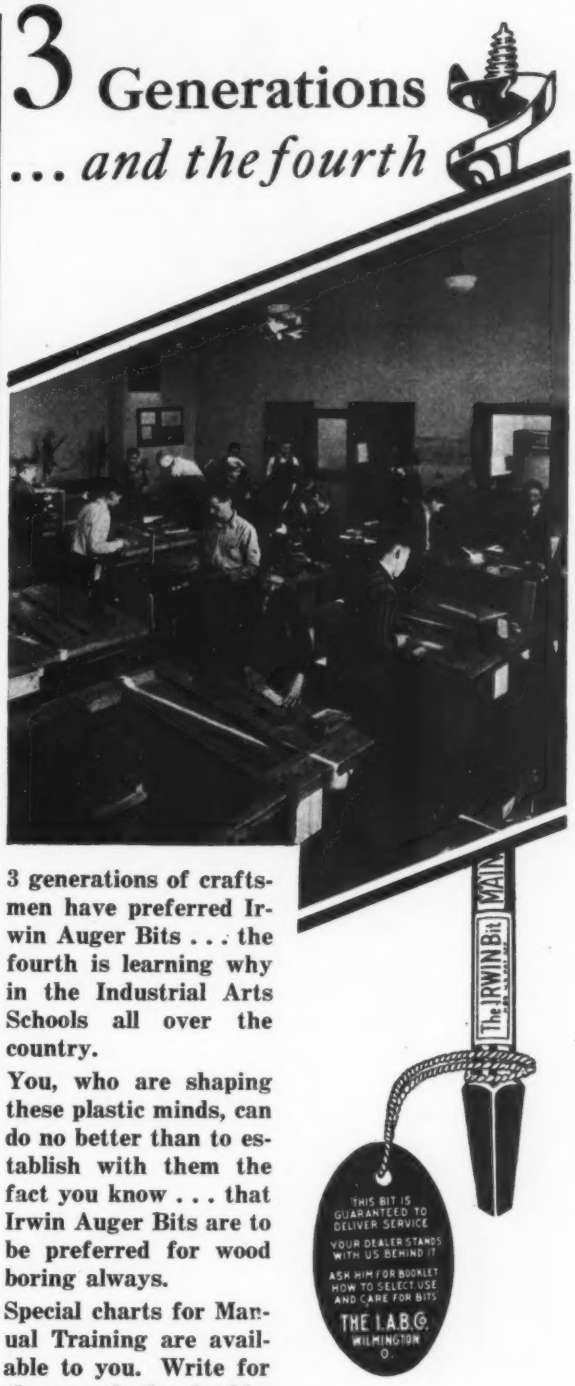
Useful Articles Made of Wood

The Pacific Coast Plywood Manufacturers, Inc., Seattle, Wash., has announced the publication of a new pamphlet, entitled "Suggestions for the Handy Man or the Manual-Training Student." The booklet illustrates more than fifty different and useful pieces of furniture which can be made from plywood, such as chests, tables, desks, and cabinets. Each of the articles pictured has been made, and drawings and full-size details of each may be obtained from the company at the small charge of fifteen cents.

Report of the Eastern Arts Association for April, 1928

Paper, 242 pages, issued by the association. Copies may be obtained from the secretary, Mr. Frank Mathewson, Jersey City, N. J.

3 Generations
... and the fourth


The IRWIN Bit
MAIN
THIS BIT IS GUARANTEED TO DELIVER SERVICE
YOUR DEALER STANDS WITH US BEHIND IT
ASK HIM FOR BOOKLET HOW TO SELECT USE AND CARE FOR BITS
THE I.A.B.CO.
WILMINGTON O.

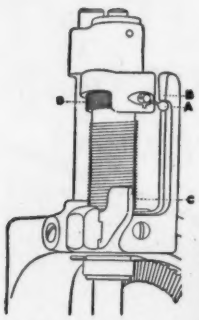
3 generations of craftsmen have preferred Irwin Auger Bits . . . the fourth is learning why in the Industrial Arts Schools all over the country.

You, who are shaping these plastic minds, can do no better than to establish with them the fact you know . . . that Irwin Auger Bits are to be preferred for wood boring always.

Special charts for Manual Training are available to you. Write for them and the booklet "How to Select, Use and Care for Bits."

THE IRWIN AUGER BIT COMPANY
Wilmington, Ohio
Sole Manufacturers of the Genuine

The IRWIN Bit
Reg. U.S. Pat. Off.

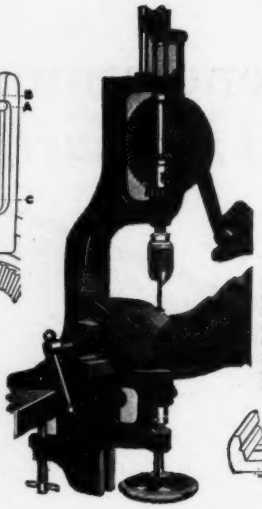


Head of "Yankee" Bench Drill.

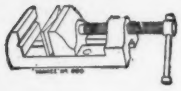
D—Ratchet Teeth.

A—Ratchet Shifter in "knock-off" position or extreme of up movement.

B and C—Automatic "knock-offs" at top and bottom.



"Yankee" Vise No. 990. Designed for use on Bench Drills. Machined true on ends, bottom and sides. Swivel jaw for taper work. Jaws open 3 in. Price, $3.30.



"Yankee" Drills *Promote Shop Efficiency*

ANY boy around the shop can safely use this "YANKEE" Bench Drill. No experience needed. The skill is built into the drill.

"Yankee" Automatic Ratchet Feed takes the place of hand feeding. It adjusts the pressure perfectly for all drills from the smallest up. This saves drills—and therefore, money.

"Yankee" Bench Drill No. 1005 (Illustrated). Two speeds. 3-jaw chuck holds drills up to ½ in. Length 28 in. Price (f.o.b. Phila.), $21.50.

"Yankee" Bench Drill No. 1003. Single speed. 3-jaw chuck holds drills up to ¼ in. Length 18¾ in. Price (f.o.b. Phila.), $13.00.

"Yankee" Chain Drill

Does difficult drilling jobs rapidly and conveniently. No hand feeding. Has "Yankee" Automatic Friction and Ratchet Feed. Just turn brace. Friction feed runs drill down to work. Then Ratchet Feed guides drill through cut with just the right pressure. Saves drill points.

No. 1500. 3-jaw chuck, holds round shank drills only, ⅛ in. up to ½ in. Length, 9¾ in. Weight, 3¼ lbs. Price, $6.00.

No. 500. 2-jaw chuck, holds square shank drills up to ½ in. Length, 10¾ in. Weight, 3½ lbs. Price, $6.00.

Some other "Yankee" Tools:

Plain Screw-drivers. Ratchet Screw-drivers. Spiral Screw-drivers. Ratchet Breast and Hand Drills. Plain Breast and Hand Drills. Ratchet Bit Braces. Bit Extensions. Automatic Push Drills. Ratchet Tap Wrenches. Vises with removable base, etc. All illustrated and described in this book.

Write for "Yankee" Tool Book

NORTH BROS. MFG. CO., Philadelphia, U. S. A.

"YANKEE" TOOLS

Make Better Mechanics

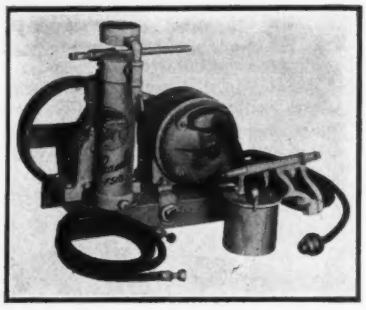
School Shop Equipment News

For the Supervisor and Teacher who desires to keep abreast with news of new Machinery, Tools, Supplies, etc.

A REAL SCHOOL SPRAY OUTFIT

The new F518 Paasche Electric spray painting outfit is described in Bulletin No. D-29 just issued by the Paasche Airbrush Co., of 1922 Diversey Parkway, Chicago, Ill.

This new unit is expressly designed to meet the demands of the school woodshop for a low-priced complete outfit that will serve to spray lacquers, paints, enamels, varnishes, shellacs, bronzes, etc., and at the same time permit the same high standard of attainment that is now so prevalent in industry, where similar apparatus of a much larger size is used. The compactness and completeness of this small spraying outfit has an especial appeal to the shop teacher in the small school.



The outfit consists of an electric motor with extension cord ready to plug into any light socket, an adjustable fan sprayer, hose, water and dirt separator, and an air tank with a pressure gauge.

With this unit the boy can obtain real production like air-finishing effects.

THE DEWALT JUNIOR

The DeWalt Products Corporation, Leola, Pa., announces the addition of a new model, the DeWalt Junior, to their line of all-purpose electric woodworkers.

This new model incorporates all of the features of the Wonder Worker. It is equipped with a 12-in. combination rip and crosscut saw. Fitted on a wooden table 29 by 59 in., the entire machine weighs but 235 pounds. It is compact and can easily be carried by two men to be set on a pair of horses or it may be moved about on a movable truck. It may be instantly changed from crosscut to ripping without stopping the motor. It is provided with an accurate ripping gauge and with dials, so that it can be set for any given position. The powerful Universal motor, with which it is equipped, operates from any cycle in either a.c. or d.c. and may be connected to any light socket.

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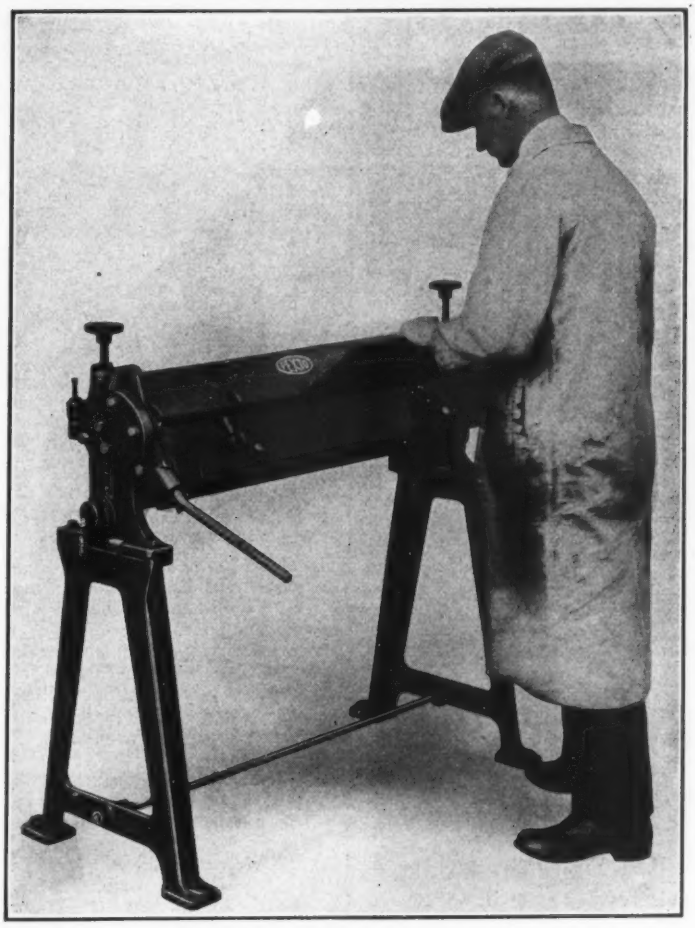


Combination Brake and Folder. Furnished for bench use or with iron floor legs.

No. 696.....36 inches
No. 697.....42 inches

For Your Sheet Metal Shop . . . Pexto Equipment

Pexto machinery for the fabrication and forming of sheet metal is the standard of comparison all through the industry. That's one very good reason why your shop should be equipped throughout with PEXTO machines.

The Brake and Folder illustrated is typical. With this machine, locks and angles can be formed on short sheet metal in a jiffy.

It is built on the brake principles with the added features for making it a general Utility Folder and Brake.

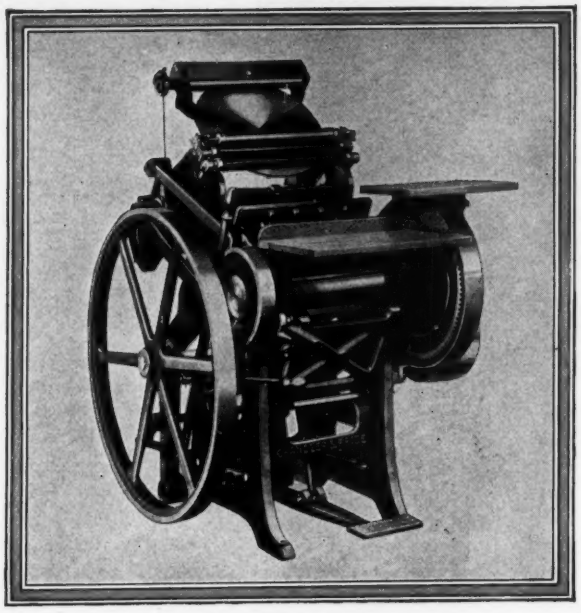
SEE OUR DATA IN BRUCE'S SPECIFICATION ANNUAL 1929 EDITION

Guide No. 25A—Hand Machines and Tools for sheet metal work.
Catalogue No. 25A—Hand and Power Machines and Tools for sheet metal work.
Power Squaring Shears, Power Presses and Power Double Seaming Machines are offered in individual bulletins. If interested, write for prospectus.

PEXTO

Your Insurance—Over 100 Years of Conservative Growth.

The Peck, Stow & Wilcox Company
Southington, Conn., U.S.A.



The Chandler & Price Press

Mastering the "C & P," *the Printer's Standard Press*

THE Chandler & Price Press has a special interest for students because it is the standard press of the printing world.

The "C & P" is the press on which the apprentice learns his trade. It is noted for its adaptability to all kinds of work. It is a criterion for simplicity of construction, for ease of make-ready, and for swift transition from job to job. It long ago established a name for low running expense, negligible cost of maintenance, almost total absence of repairs, and slight depreciation.

Above all else, C & P Presses are famous for accuracy of register, heavy impression, and all-around excellence of results. In the schools of today they accustom the business men of tomorrow to the value of effective, artistic printing. Have you *enough* Chandler & Price Presses in your printing departments?

Chandler & Price
PRESSES & PAPER CUTTERS

THE CHANDLER & PRICE COMPANY
Cleveland, Ohio, U.S.A.

(Continued from Page 36a)

With this machine, 29 distinct cutting operations may be undertaken. These include dadoing, routing, mitering, shaping, grooving, plowing, riveting, mortising, tenoning, gaining, etc.

NEW AUTO MECHANIC SERVICE BOOK

The South Bend Lathe Works of South Bend, Ind., has just issued its new Bulletin No. 66, illustrating and describing modern machine methods in the auto service station shop.

The booklet outlines the latest shop practice and methods used in the large, modern service station shops for servicing the mechanical parts of automobiles, trucks, and busses. It contains tables and other useful information concerning sizes and types of new model South Bend lathes, sizes of tap drills, weights and measures, and standards for wire gauges, together with typical installation directions and layouts for various lathes.

The book is well illustrated and is a fit companion piece to their machine-shop course for vocational schools.

This booklet is free to instructors.

ANNOUNCE NEW EDITION OF WEBER CATALOG

The F. Weber Company, 1220 Buttonwood St., Philadelphia, Pa., has announced the 1929 edition of the general catalog, 600.

The new catalog, which is devoted to artists' materials, drawing materials, drawing instruments, draftsmens' and engineers' precision instruments, and school supplies, is quite complete and inclusive. The articles listed are well described and illustrated. A section of the booklet is devoted to books on alphabets, painting, etc. A complete index will be found in the back of the booklet.

NEWS AND NOTES

Civil-Service Examinations for Teachers of Home Economics. The U. S. Civil Service Commission of Washington has announced open competitive examinations, to be held about April 9, for the position of teacher of home economics in the junior high school, in the senior high school, and in the elementary school, at salaries of $1,680, $1,860, and $1,560 per annum.

The examinations are to fill vacancies in the Indian service, and vacancies occurring in positions requiring similar qualifications. Competitors will be rated on questions relating to methods of teaching, home management, foods, clothing and sewing, and on education, training, and experience in teaching the subject.

Complete information regarding these examinations may be obtained by writing to the U. S. Civil Service Commission at Washington, D. C., or to the secretary of the U. S. Civil Service Board of Examiners at any post office or customhouse.

(Continued on Page 41a)

(Continued from Page 38a)

Motion-Picture Films for Automotive and Allied Industries. The U. S. Department of Commerce has recently announced the completion of a number of motion-picture films illustrating the manufacture and utilization of motor gasoline and lubricating oils as a part of the educational work in the conservation of fuel oils.

The latest addition to the series is one entitled "The Power Within, or The Construction, Operation, and Care of the Internal Combustion Engine." Another film recently produced is entitled "The Story of the Gasoline Motor," which is intended to acquaint the automobile owner with the workings of the motor. Other films in the series are "The Story of Lubricating Oil," "The Story of a Storage Battery," "The Story of the Heat Treatment of Steel," "The Story of Lubrication," and "The Story of a Spark Plug."

The films will be loaned free of charge through the Pittsburgh Experiment Station of the U. S. Bureau of Mines, Pittsburgh, Pa., upon the payment of the transportation charges.

New Film on Heat Treatment of Steel. The latest addition to the library of educational motion-picture films produced by the U. S. Department of Commerce is entitled "Heat Treatment of Steel." The film was prepared under the supervision of the U. S. Bureau of Mines, illustrates 1,475 parts of a typical automobile, and shows the special heat treatment as a part of the automotive industry. It shows the various steps in the forging process, illustrates the process of surface hardening of steel parts, and the testing of the heat-treated steel. Copies of the film may be obtained from the Pittsburgh experiment station of the U. S. Bureau of Mines, Pittsburgh, Pa.

Motion-Picture Film on Internal-Combustion Engine. The story of the construction, operation, and care of the internal-combustion engine is described in a new motion-picture film on "The Power Within," issued by the U. S. Bureau of Mines, Pittsburgh, Pa. The film was prepared for the benefit of the engineering student and the automobile mechanic to acquaint him with the essential mechanical features of the motor.

Announce Vocational Index for Industrial Arts. The department of vocational education, University of Michigan at Ann Arbor, has begun the compilation of a vocational index of industrial-arts work for the benefit of teachers of industrial arts, industrial education, and vocational education.

The work of compiling the index is in charge of Mr. Thomas Diamond, associate professor of vocational education at the University. The first set of cards were printed by Mr. George B. Frazee, of the Grand Rapids Technical and Vocational High School. Mr. Frank Bruce, of the INDUSTRIAL-ARTS MAGAZINE assisted the movement by helpful suggestions. A number of well-known schoolbook publishing houses have offered to supply cards for the books which they publish on vocational and industrial-arts subjects.

It is the purpose of the university vocational department to make the index as complete and accurate as possible and to this end it has solicited the cooperation of all teachers in securing the names of important articles and books which should be included.

The books and articles are listed on cards 3 by 5 in. in size. Those who are interested, should communicate with Prof. Thomas Diamond.

Springfield Industrial-Arts Club Holds Meeting. The members of the Industrial-Arts Club of Springfield, Mo., held their regular monthly meeting on Wednesday, February 13, at the Central High School in Springfield. The club was organized in 1927 and has a membership of fifteen instructors of industrial arts. Meetings are held every second Wednesday of every month for the discussion of topics of educational importance.

The present officers of the club are: President, Mr. Paul O'Neill; vice-president, Mr. Herbert Oheim; secretary-treasurer, Mr. C. E. Erickson.

American Educators Invited to Visit Danish Educational Institutions. Denmark has issued an invitation to American educators to visit the educational institutions of the country during the summer. The opportunity has been made possible through the efforts of Dr. Sven V. Knudsen, a former

(Continued on Page 42a)

Drawing Tables

—for Any School
—for Any Size Class
—for Any Number of Students

For 8 Students
No. 205

Provides individual accommodations for 8 students. Four compartments open to the front and four to the rear, holding drawing boards and other equipment. This desk takes care of the greatest possible number of students in the same room.

For 6 Students
No. 220

One of our best sellers—very roomy and comfortable, with an adjustable top. Very popular for high schools—6 compartments for 6 students—each containing drawing board, T square, triangles, paper, and instruments.

For 4 Students
No. 240

A good type of Drawing Table for Universities. Provides accommodations for four students, each with individual drawing board compartment and individual drawer for instruments, both locked with same padlock.

The old order is passing—modern schools are becoming equipped with attractive and highly efficient Kewaunee Drawing Tables.

The Kewaunee line comprises Tables designed for two to eight students—all designed for the greatest compactness, comfort, and convenience. They are firmly constructed to insure rigidity for long service under rough student usage. Finished in Light Golden Oak—the standard Kewaunee finish—or we match any special finish desired.

We are manufacturers of a very complete line of Art and Mechanical Drawing Tables. Write for our complete Book of Illustrations.

Kewaunee Mfg. Co.
LABORATORY FURNITURE EXPERTS

SEE OUR DATA IN BRUCE'S SPECIFICATION ANNUAL 1929 EDITION

Adrian Factory
C. G. CAMPBELL, Pres. & Gen. Mgr.

Designers and Manufacturers of Art and Mechanical Drawing Room Furniture for Schools and Colleges

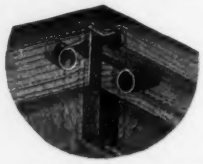
1 End South Center St.
ADRIAN, MICHIGAN.

SHELDON MANUAL TRAINING BENCHES
Are an Inspiration to Students

There are Sheldon benches still in use that were installed over a quarter of a century ago. When you buy Sheldon benches you know that you are getting benches that are practically impossible to wear out.

Wherever manual training benches are used Sheldon benches are known. They are known for their attractive appearance, their sturdy bolt re-enforced construction, dove-tailed drawers, edge grained tops, and for their efficient, easy working vises.

Sheldon benches are an inspiration to students and supervisors. It is a pleasure to work at them, because they are so strong, sturdy and convenient. There is no time out for repairing. They give the community the greatest value for its investment.



The bolted joint is an essential part of the good Sheldon Bench.

E. H. SHELDON & COMPANY

Laboratory, Home Economics and Vocational Furniture

MUSKEGON, MICHIGAN

(Continued from Page 41a)

supervisor of Danish preparatory schools, who has arranged for two of the famous Peoples' Colleges to be open so that members of his party may visit them, study the activities, converse with the teachers and students, and attend the classes. Twice a week there will be lectures at the University Club of Copenhagen, and at Chateau Lerchenborg, where Dr. Knudsen will entertain the members of the party. Of particular interest to the visitors will be the world conference of new education, to be held at Elsinore from August 8 to 17. The meetings will be held in the Kronborg Castle, the scene of Shakespeare's "Hamlet."

New Jersey Industrial School Studies Skilled Labor From the Worker's Viewpoint. A number of surveys have been made by the social agencies to determine the opportunity which the negro of the north has to enter the various skilled trades, and the results of these surveys had attracted considerable publicity.

In an effort to obtain first-hand information from the worker himself, Mr. W. R. Valentine, of the Bordentown Manual Training School invited a group of colored craftsmen to meet with him and Mr. Wesley O'Leary, assistant commissioner of education, for the purpose of collecting and compiling facts governing the skilled employment of negroes in New Jersey and the large neighboring cities, in order to determine whether the school is giving its graduates the type of training needed to best fit them for skilled employment.

At the first meeting, the conference attracted fourteen men, each one a creditable representative of the skilled craft which he followed and presenting an excellent example of the opportunities offered the negro in the skilled trades as compared with the professions. Eight trades were represented, comprising a cross section of the negro's activity in the field of skilled labor, and including agriculture, auto mechanics, bricklaying, carpentry, electricity, painting, plumbing, and printing.

In the discussions, the friendly union relations between white and colored workers in the building trades of North Jersey were disclosed, as evidenced by the fact that five hundred colored men are members of the bricklayers', masons', and plasterers' locals of Newark and the Oranges. A negro electrician was found to have the largest electrical contracting business in the Asbury Park district. Practically all the sand used in Moorestown's building operations is furnished by a colored farmer. Reference was made to the half-trained or untrained negro workman who turns in poor performances of jobs, and who hurts the reputation of the real negro craftsman.

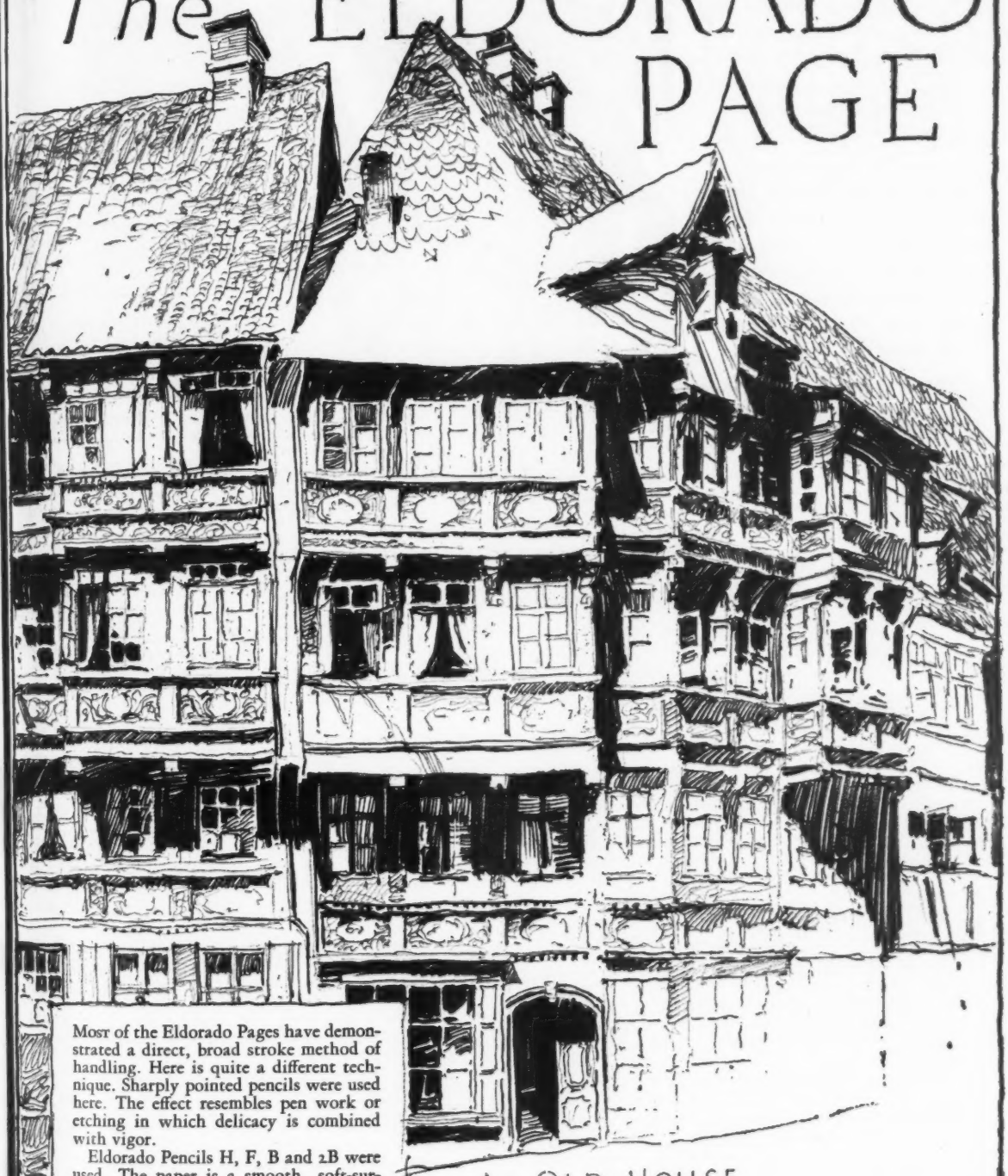
Racial restrictions were found to exist more widely in the plumbing, printing, and electrical trades, but even here lucrative returns await the skilled worker who succeeds in breaking through the barriers. For the average man, however, the conference listed the trades in the order of desirability as regards chances of employment as follows: Bricklaying, cement work, and plastering; carpentry; agriculture; auto mechanics; painting; printing; electricity; and plumbing. Several dicta were laid down as findings of the conference, which have been practically accepted, and which are summed up below:

1. In the large cities, masons' and carpenters' trades offer the negro the best chance of skilled work, North Jersey being the best field.
2. Auto mechanics and interior renovating (painting and paper hanging) are profitable trades in all sections of the state and in small communities as well as large cities.
3. Restrictions on account of race are practically nonexistent in agriculture.
4. The negro's best chances of employment seem to be in those trades where men can work singly or in small groups, rather than in large numbers.
5. A reputation for efficiency goes far toward removing the obstacles that bar the negro craftsman from skilled work. The efficient workman represents a money profit to his employer. Few employers are so prejudiced as to refuse a demonstrated profit, simply because the workman who offers it happens to be a negro.

Vocational Training Extended at St. Louis, Mo. The board of education of St. Louis, Mo., has made provision for the extension of vocational-training opportunities in the city.

(Continued on Page 44a)

The ELDORADO PAGE



Most of the Eldorado Pages have demonstrated a direct, broad stroke method of handling. Here is quite a different technique. Sharply pointed pencils were used here. The effect resembles pen work or etching in which delicacy is combined with vigor.

Eldorado Pencils H, F, B and 2B were used. The paper is a smooth, soft-surfaced paper: a Kid Finish Bristol.

Mr. Watson made this sketch with Dixon's Eldorado, "The Master Drawing Pencil." Are you fully acquainted with ELDORADO? *If not, send for samples to the Joseph Dixon Crucible Company, Pencil Department* **128-J**, *Jersey City, New Jersey.*

CATALOG "F" should be in the hands of every school executive. It will be sent promptly, prepaid, upon request. In it you will find a complete line of laboratory furniture, giving in concise terms the exact construction of each piece. The many illustrations will convey to you a clear idea of the completed furniture as a large number of them are made from actual photographs . . . . . .

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Representatives in all Principal Cities

(Continued from Page 42a)

In order to provide more adequately for those who find themselves unable to finish the regular course offered in the intermediate and senior high schools, the superintendent has asked that there be established a school of vocational type devoted to the needs of those looking toward early employment; that there be created the position of principal of the vocational school, with the rank and salary of a high-school principal; that there be created the position of clerk of the vocational school, with the rank and salary of a clerk in the administration division. The vocational school is intended as an added opportunity for the extension of vocational training, and to create an added demand for more complete cooperation between the school on the one hand and the employer and the employee on the other.

The program as outlined will comprise industrial-arts courses, graphic-arts courses, household-arts courses, and commercial courses.

The commissioner of school buildings is preparing plans for the erection of a vocational school on the site of the old Central High School. The building will be erected in separate units and will be so constructed that any part of it may be easily converted to a different use from that to which it was originally dedicated.

Tulsa Offers Ground Course in Aviation

Striking while the iron is hot, Tulsa, Okla., has inaugurated a ground course in aviation while enthusiasm is at its height in the city. Tulsa has recently been put on the route of the air-mail service, has acquired an airplane manufacturing industry, and at present supports four different airplane-landing fields.

Although limited primarily to adults, the night-school course for the first semester had an average attendance of almost 100 persons, and enthusiasm for the second term ran high. It is a purely lecture course, conducted by Mr. Collier, a leading pilot at one of the Tulsa airports, who has designed, built, and flown his own airplaines. His course includes lectures on meteorology, engine mechanics, plane construction, plane operation, air-traffic rules, and a brief look into the future of aviation.

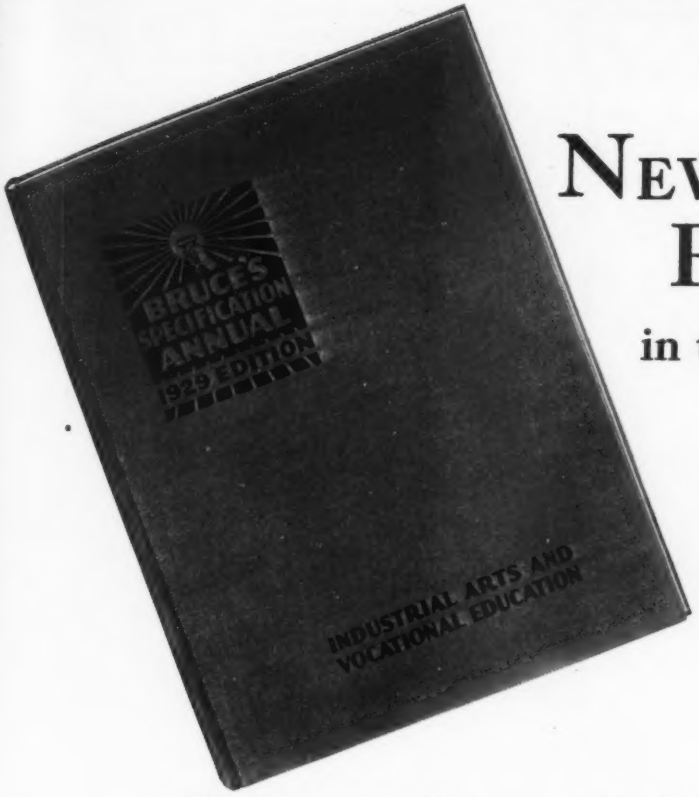
Following the success of the present course, Mr. O. B. Badger, director of vocational education, has begun plans for a semester's course, to begin next September, as an elective in the manual-arts course at the high school. A Liberty motor and a set of airplane instruments have been secured, and negotiations are under way to secure a Wright "whirlwind" motor and various plane parts as instructional material for the course. Mr. Charles Fleischman is working out the details of the course.

The Law Governing Vocational Schools. A recent ruling of the Wisconsin department of public instruction is to the effect that in a city of less than 5,000 population, the question of establishing a vocational school rests with the school board. The law does not provide any method by which a vocational school can be discontinued after it has once been established.

New Technical High School at Indianapolis, Ind. The school authorities of Indianapolis have announced the completion of two new wings of the main building at the Arsenal Technical High School. The new building houses the home-economics department and twelve new laboratories which are equipped to offer this form of instruction under the most favorable conditions. The laboratories are planned to accommodate 24 students each. The food laboratories are furnished with kitchen stoves, worktables, sinks, and utensils of the most modern kind. A kitchenette and dining room are provided, as well as sewing tables, pressing boards, electric machines and plates for clothing work. The wings also provide a number of rooms for regular academic classes.

Inspect Apprentice-Built House at Portland, Oreg. The new apprentice-built house at Portland, Oreg., was thrown open for inspection during the week of January 7. In connection with the inspection, Mr. C. A. Bigelow, acting mayor of Portland, presented badges to the apprentices, who, with the completion of the house, have become journeymen in their respective branch of the work. The house was erected in one of Portland's most attractive residence districts, under the instruction of Mr. David M. Anderson, teacher of carpentry,

(Continued on Page 46a)



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All the features which made the first edition so valuable to instructors and supervisors of Industrial Arts are further amplified in the New 1929 Edition of BRUCE'S SPECIFICATION ANNUAL which is now on sale. In addition much new material never before available has been collected and is presented in handy, usable form.

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1. Progress of Vocational Education in the United States

A review by J. C. Wright, Director of Federal Board for Vocational Education, introduces the first authentic, unified statement **ever** contributed by the State Supervisors, Directors and Superintendents on the "Status of Vocational and Industrial Arts Education in the Various States."

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2. Status of Vocational Education in Canada

An official summary of the forward march of Vocational Education in a great, new, progressive country.

3. Part-Time Vocational Education at Milwaukee

R. L. Cooley, President of the American Vocational Association and Director of the Milwaukee Vocational School, tells the intimate story of a great school which has won national recognition and which has served as the model or inspiration for many another successful institution.

4. Educational Directory

An accurate directory giving the names and titles of all Federal and State officials connected with Vocational Education. The United States Territories and Canada as well are covered.

5. Teacher Training Schools

Universities, Colleges, and Normal Schools offering Teacher Training Courses for Industrial and Vocational Education are listed with their department heads.

6. Equipment Lists

Major equipment lists, small tool lists, and supply lists for each class of course—elementary, junior high, senior high, technical and full-time vocational, and part-time vocational—follow each of the seven major divisions of the ANNUAL.

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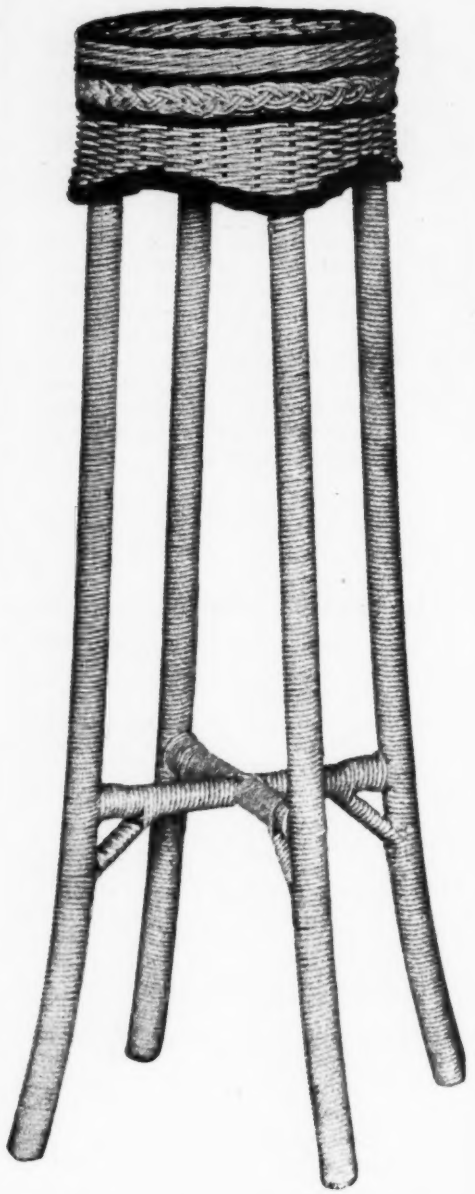

The smoking stand shown here and a hundred odd other practical furniture projects can be made in your classes. No special or extra equipment to buy. The frames are furnished in knockdown form ready for pupils to assemble. No sawing or drilling holes—this has all been done. Nails, braces, silence domes and glue sizing are furnished complete with each project. Weaving materials furnished in color combination of black and orange. Try this project and see how fascinating the work really is.

Grand Rapids Fibre Cord Company
609 Myrtle Street, N. W. Grand Rapids, Mich.

(Continued from Page 44a)

and under the general supervision of Mr. L. E. Brigham, director of vocational education in the Portland schools.

The apprentices performed their work under the supervision of skilled union mechanics and instructors. Competent building authorities have expressed the opinion that for workmanship and materials, the house cannot be surpassed.

Hold Fire Prevention Poster Contest. The Home Insurance Company of New York City, has announced a poster contest for the best designs in fire prevention. The company has issued a circular giving full information and details concerning the contest.

It is the purpose to enter the first prize-winning poster in the national contest of the company where it will compete with the prize-winning posters from home agents all over the country for the national prizes of $100, $50, and $25.

It is expected that the first prize-winning poster of the national contest will be reproduced in color and distributed throughout the country during fire-prevention week in October.

Missouri House Appropriates $452,000 for Vocational Education. The Missouri House has recommended the $452,000 to match the Federal grant for vocational education. The vocational bill providing additional funds for vocational education was recently signed by President Coolidge.

Tests for Students in Vocational Subjects. Tests and measurements applied to students of vocational subjects were discussed at a recent luncheon of the New York Gregg Shorthand Association at the Hotel Pennsylvania, attended by more than 300 commercial teachers of New York and vicinity.

Dr. P. M. Symonds of Teachers College, Columbia University, speaking before the association, urged the adoption of standard tests on the basis that they not only clarify the purpose of the course, but speed up the entire process. The three general types of standard measurements were discussed with a view of extending their use. Mr. L. A. Rice, assistant in secondary education of the New Jersey state education department, was in charge of the discussion.

New Smith-Hughes Course at Fort Dodge, Iowa. A new Smith-Hughes course in vocational training is being offered in the high school at Fort Dodge, Iowa, during the present semester. The course which has been worked out with the cooperation of the state vocational department, calls for one period a day of drafting, and two periods a day of woodwork and mechanics. The vocational work is in addition to the work in manual training and is similar to the courses offered in other Iowa cities under the Smith-Hughes Law.

Boys' Aero Club Formed in New York City. An aero club has been formed in the Stuyvesant High School, New York City. Besides paying visits to large outside plants, the boys will listen to lectures given in the club for the benefit of those who will construct airplane models. During the previous terms the club devoted itself mainly to the construction of planes that looked good and were proportional to regular flying planes, but which could not fly. With the opening of the second semester, the boys have begun the construction of regular flying models. It is planned to hold an exhibit of model flying airplanes sometime during the present term. The president of the club is Percival Gaele.

Large Enrollment in Vocational School at Urbana, Ill. A total of 150 men have been enrolled in the vocational school at Urbana, Ill. The course includes such subjects as masonry, painting and paper hanging, plastering and cement work, electricity, sheet-metal work, plumbing and steamfitting. It offers twenty weeks of work, divided between the Urbana and Champaign high schools.

New Trade School Opened in Philadelphia, Pa. The Jules E. Mastbaum Trade School was opened in Philadelphia on February 4. The school, which is considered one of the finest in the country, will take care of 5,000 pupils. Eventually the school will offer complete courses in industrial arts, economics, commerce, music, and vocational art. All courses offered are intended to afford the pupil an opportunity to explore the several fields of activity, and to offer practical work leading to useful industry.